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Closer Relations through
"Clarion Service Manual"

Service Manual

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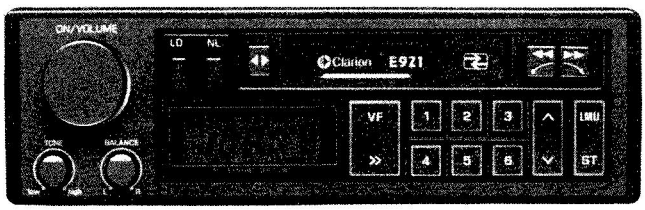
Clarion Shoji (U.K.) Ltd. 4-6, Faraday Road, Dorcan Industrial Estate, Dorcan, Swindon, Wiltshire, SN3.5HQ United Kingdom Tel: (0793) 24081 Telex: 44689

Model E921 (PE-9065A)
E920 (PE-9066A)



E921

E920

■SPECIFICATIONS:

Radio section

Circuit system:	Superheterodyne
Tuning system:	Electronic tuning
Receiving frequency:	LW 153kHz to 281kHz MW 531kHz to 1,602kHz UKW(FM) 87.5MHz to 108MHz
Intermediate frequency:	
	LW, MW 459kHz
	UKW(FM) 10.7MHz

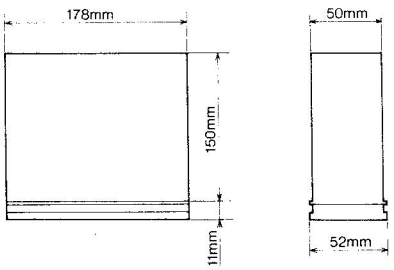
Tape section

Reproduction system:	Auto reversing 4 track, 2 channel stereo cassette tape playback (Monaural also capable)
Tape speed:	4.76cm/sec. (1⅞ ips)

Composite

Speaker impedance:	4Ω×2
Power output:	10W×2 (at 10% distortion TYP.) More than 20W×2 (at max. output TYP.)
Power supply voltage:	DC 14.4V (10.8V to 15.6V) Negative ground
Power consumption:	Less than 5A (at max. output)

Dimensions:



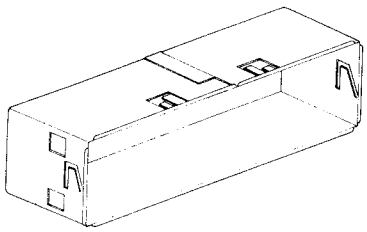
Weight: 1.5kg

■COMPONENTS VIEW:

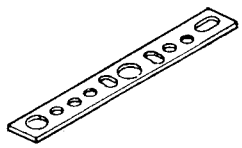
- **E921 (PE-9065A-A)**
- **E920 (PE-9066A-A)**

Main unit

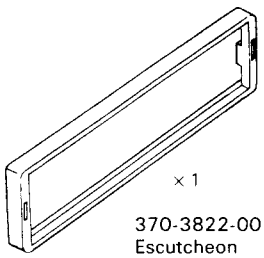
Mounting bracket 300-7110-00 1



Mounting bracket 300-6954-00 1



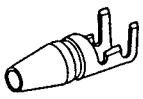
Parts bag 922-1396-00 1



×1

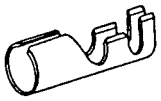
370-3822-00
Escutcheon

Parts bag 921-7909-00 1



×2

073-0635-00
Terminal

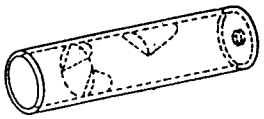


×2

073-0636-00
Terminal

×2

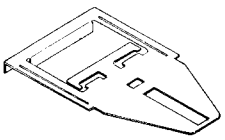
348-0136-00
Terminal cover



×2

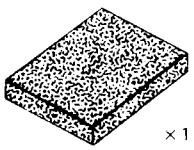
348-0137-00
Terminal cover

Parts bag 921-8022-00



×2

330-8216-00
Hook plate



×1

345-2934-00
Cushion

×1

345-3653-01
Spacer

×1

725-0181-00
Plate nut

×1

700-5016-10
Tap screw

×1

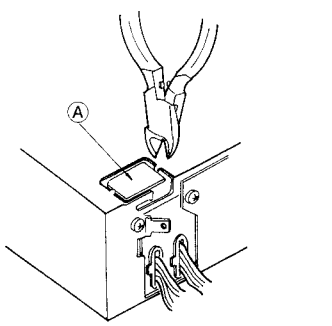
722-0314-00
Nut

■FEATURES:

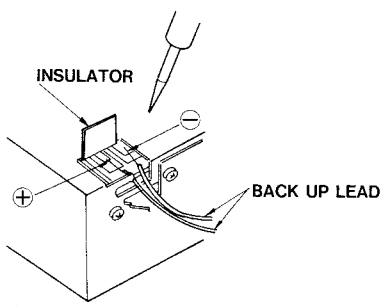
- MW/LW/UKW-MPX electronic tuning radio with auto reverse stereo cassette player (FF, REW lock).
- Provided radio traffic information (VF) system. (E921)
- NL (Noise Limiter).
- LD (Loudness).
- Hi-power.
- ARC-2 mechanism

■WIRING OF BACK UP LEAD:

(for TAKE AWAY KIT)



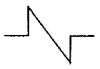
1 Remove section A with a nipper or a similar tool.



2 Solder the back up lead with a soldering iron. Make sure that + and − are not confused.

■ADJUSTMENT:

[CAUTION]
1. All adjustment should be made at room temperature.
2. Do not remove "Lower case" for adjustment.

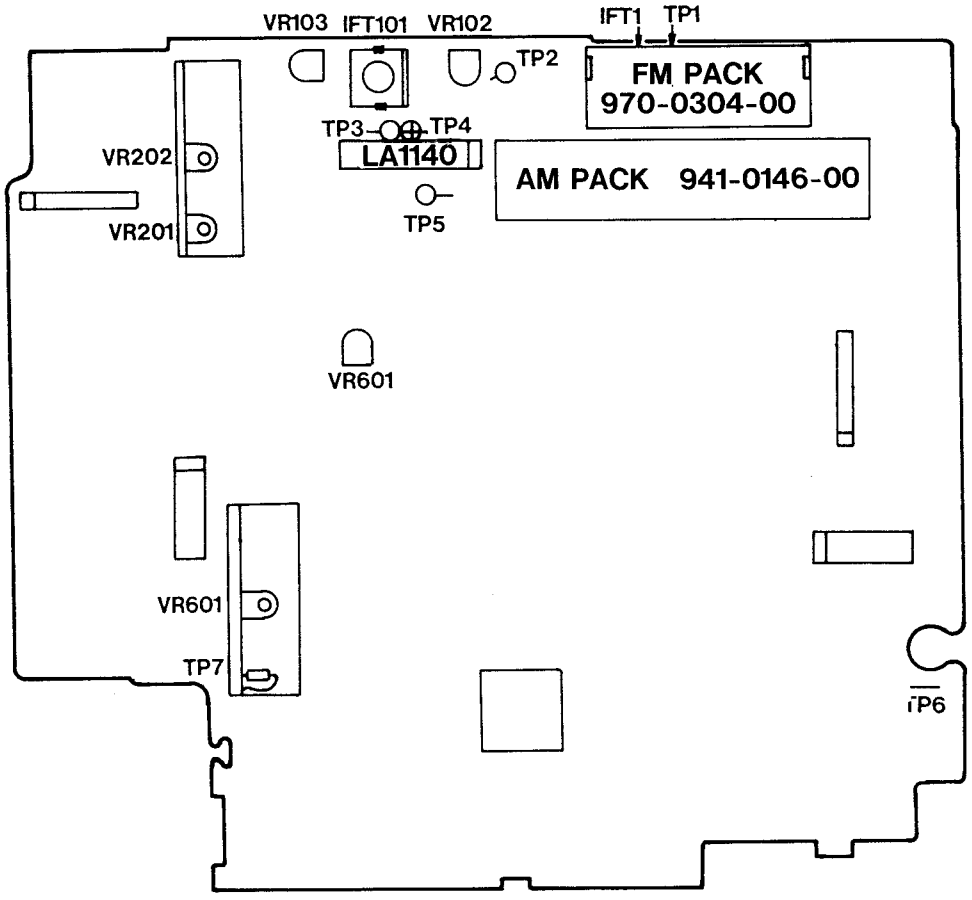
Adjustment item	Adjustment point	Procedure
S curve	IFT1 and IFT101	1. Connect the output of an IF sweep generator to TP1 and the input of the vertical hold of an oscilloscope to TP4. 2. Ground TP5. 3. Adjust the S curve by means of IFT1 and IFT101.  (Max. and symmetrical)
0V fine adjustment ＊1	VR102	1. Tune at 98.0MHz (98.000MHz) and input a 40dB non-modulated SSG signal. 2. Connect a digital volt meter between TP2 ⊕ and TP3 ⊖. 3. Adjust VR102 so that the voltage between TP2 and TP3 is 0V±50mV. 4. May adjust 0V by receiving broadcasting signal.
Stop seek sensitivity	VR101	1. Tune at 98.0MHz (98.000MHz), input a 25dB non-modulated SSG signal. 2. Adjust VR101 so that the voltage of TP6 is in the range 0V to 7V.
SASC	VR103	1. Tune at 98.0MHz (98.000MHz), input an 55dB, 7kHz modulation frequency, 30% modulation degree SSG signal, and then turn on ST. SW. 2. Adjust the output level of the volume controller to 0dBm (0.775V). 3. Set the SSG output to 40dB and adjust VR103 so that the output level is −3dBm.
MPX Pilot canceller	VR202	1. Tune at 98.0MHz (98.000MHz), input a 55dB, modulation (PL 10%). 2. Adjust VR202 so that output of the set is minimum.
MPX Separation	VR201	1. Tune at 98.0MHz (98.000MHz), connect the output of a stereo modulator to the external modulation terminal, and input a 65dB SSG signal. 2. Set the stereo modulator to the L or R ch and adjust VR201 so that the maximum separation is obtained.
DK VCO (E921)	VR601	1. Tune at 98.0MHz (98.000MHz), input a 55dB non-modulated SSG signal, and turn on VF. SW. 2. Connect the frequency counter to TP7 through a 22kΩ resistor and adjust VR601 so that the counter indicates 125Hz. In the case, 25sec. later, seeking occurs.

[NOTE] After the adjustment of frequency range, be sure that;
(1) Band edge frequency of LW shall be 148.5kHz −20kHz
(2) Band edge frequency of UKW shall be 87.5MHz +100kHz −160kHz
at low end. And shall be lower than 108.16MHz at upper end.

＊1 : For adjusting 0V, electrify the set, and after leaving it at room temperature fully, make measurement and adjustment. For checking, it is enough that the potential difference between TP2 and TP3 is within ±300mV.

● SPECIFICATION —LIMIT— Quieting sensitivity: MW Less than 33dB (at 20dB S/N)
LW Less than 39dB (at 20dB S/N)
UKW Less than 12dB (at 30dB S/N)
Stereo separation: UKW More than 20dB

● ADJUSTMENT POINT



[NOTE] Adjustment should be done from parts side.

■ADJUSTMENTS:
(TAPE MECHANISM)

1. Head Azimuth Adjustment (See Fig. 1)

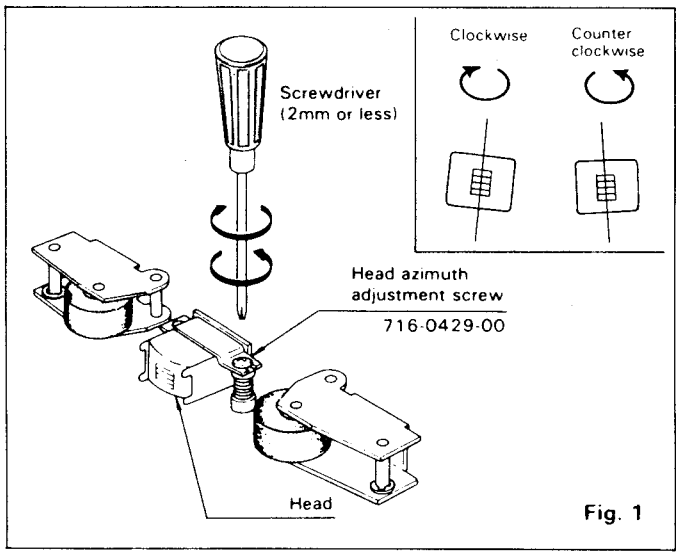


Fig. 1

2. Fast Forward, Rewind Gear Alignment (See Fig. 2)

o If the mechanism does not operate properly and abnormal sound (gear noise) is produced at the time of fast forward and rewind, first of all check whether the sound is produced during fast forward (FF) or rewinding (REW). If it is produced during FF, adjust by bending the claw (A) to the left or right with radio pliers, etc., and if it is produced during REW, adjust by bending the claw (B) in the same manner. Adjust so that the clearance at this time between the flywheel and FF. REW gear becomes about 0.1 to 0.2mm.

1) If the gear engagement is loose and the gears produce a large noise, bend the claw away from the center line.

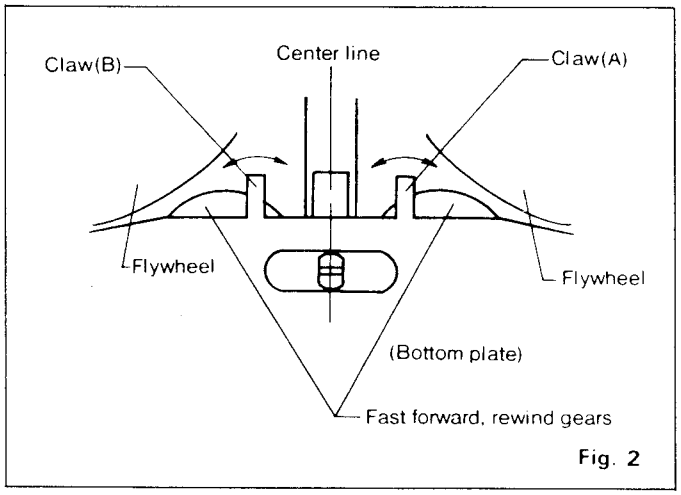


Fig. 2

2) If the gear engagement is too hard and there is no clearance between the gears, bend the claw toward the center line.

3. Adjustment of Power Switch (See Fig. 3)

o If power does not turn on when pack is inserted (loaded), or if power does not turn off after ejecting the pack, and the underlying cause is found to be misadjustment of the power switch, adjust the switch at proper position by bending upward or downward the adjusting claw of the guide arm ass'y by means of radio pliers, etc. However, make sure that at the time of ejecting there is a clearance of at least 0.2mm to 0.3mm between the body of the switch and the switch lever.

1) If power does not turn on when loading pack, adjust by bending the adjusting claw downward.

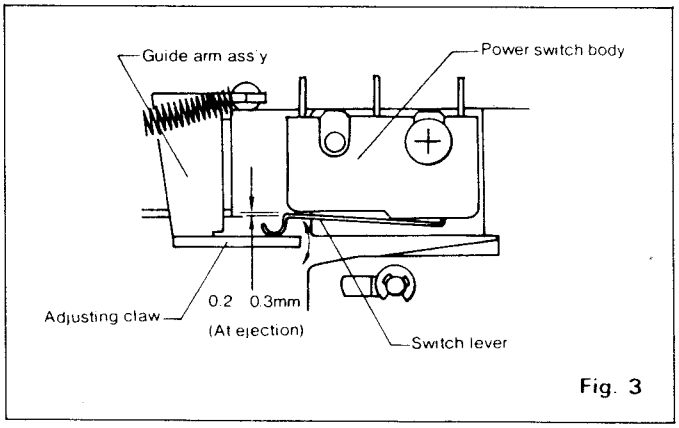


Fig. 3

● SPECIFICATION —LIMIT— Wow and flutter : Less than 0.25% (W.R.M.S)

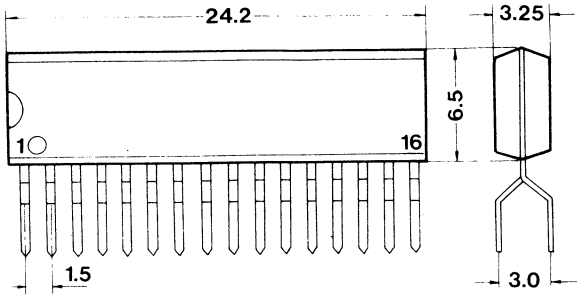
■EXPLANATION OF IC's:

■LA3430 051-0733-00 FM MPX (Tentative Standard)

Feature

FM stereo multiplexer built in functions as pilot canceller, stereo noise controller, high frequency cut controller and automatic changer between stereo and monaural.

Figure



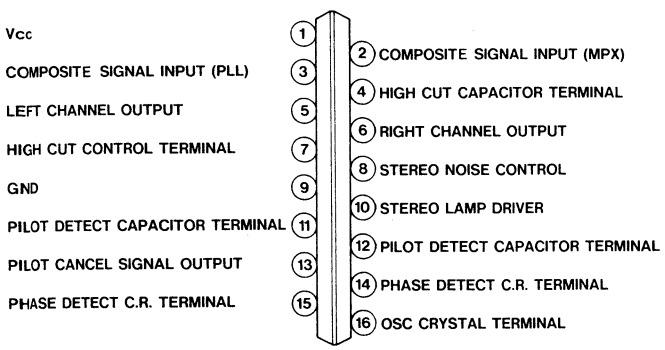
Absolute Maximum Ratings (Ta=25°C)

Supply Voltage	Vcc	16V
Lamp Drive Current	I_D	30mA
Power Dissipation	P_D	520mW

Electrical Characteristics (Ta=25°C, Vcc=10V, Vi=300mV, f=1kHz, L+R=90%, PILOT=10%)

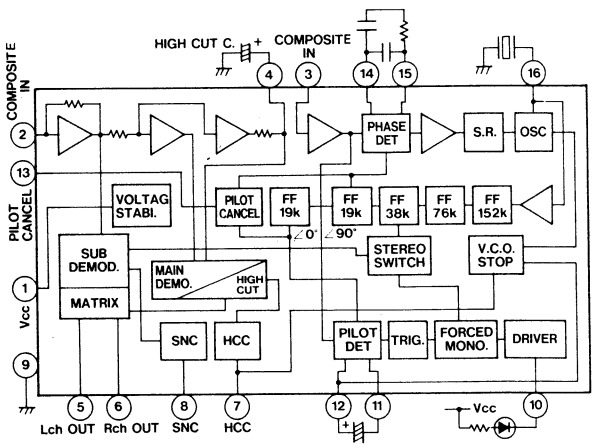
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Non-signal current	Icco	No input		28	38	mA
Channel separation	Sep		40	50		dB
Total harmonic distortion	THD	Monaural		0.07	0.2	%
		Main		0.07	0.2	%
Lamp turn-ON level	V_L	L+R=90%, PILOT=10%	60	85	120	mV
Lamp hysteresis	hy			3	6	dB
Capture range	CR			±1		%
Output signal level	Vo	sub	150	215	300	mV
Signal/noise ratio	S/N	Rg=20kΩ	68	74		dB
		Rg=10kΩ	70	78		dB
Input resistance (Pin 2)	ri			20		kΩ
SCA reject ratio	SCArej			80		dB
Allowable input voltage	Vi	THD=1% Rg=20kΩ	700	900		mV
		THD=1% Rg=10kΩ		450		mV
SNC output attenuation degree	Att SNC	V8=0.6V, L−R=90%, PILOT=10%	−8.5	−3.0	−0.3	dB
SNC output voltage	Vo sub	V8=0.1V, L−R=90%, PILOT=10%			5	mV
HCC output attenuation degree	Att HCC(1)	V7=0.6V, L+R=90%, PILOT=10%	−15.0	−6.0	−0.5	dB
	Att HCC(2)	V7=1V, L+R=90%, PILOT=10%	−2.0		0	dB
Supply voltage ripple rejection	Rr			35		dB
VCC STOP voltage				7.3		V
Channel balance				0.5	1.5	dB
Pilot cancelling degree			20	27		dB
Stereo amplifier current		Minimum stereo operating current	1.0			mA
Saturation voltage (Pin 10)		I_L=10mA		1.0		V

Terminal Connection



No.	Name of terminal	Function
1	Vcc	Connected to power supply.
2	Composite signal input (MPX)	Composite signal input terminal to MPX unit.
3	Composite signal input (PLL)	Composite signal input terminal to PLL unit.
4	High-cut condensor terminal	Connects a condensor to improve S/N ratio on audio sensitivity by attenuating high-pass of voice signal in the weak electric field.
5	Left channel output	Generates voice signal in the left channel.
6	Right channel output	Generates voice signal in the right channel.
7	High-cut control (HCC)	When voltage applied to this terminal is dropped down to about 1.0V or less (when Vcc=10V), 7kHz or more of the main signal (Monaural signal) is dropped, so that S/N ratio for the audio sensitivity may be improved. When voltage of 7V or more is applied to this terminal, V.C.O. oscillation is stopped, putting the system in the forcible monaural mode. In this case, HCC and SNC become not operatable.
8	Stereo noise control (SNC)	As voltage applied to this terminal is decreased gradually, output of SUB DETECTOR (differential signal) drops gradually, so that the voice signal output is put nearly in the monaural mode, providing the favourable S/N ratio in the weak electric field.
9	GND	For grounding
10	Stereo lamp driver	Absorbs the stereo lamp drive current of up to 30mA.
11 12	Pilot detect condensor terminal	Connects a condensor for detection of the pilot signal.
13	Pilot cancel signal output	Generates a faulse triangular wave of 19kHz to cancel the pilot signal.
14 15	Phase detect C.R. terminal	Connects C.R. for phase detection.
16	OSC CRYSTAL terminal	Connects a oscillating crystal or ceramic resonator.

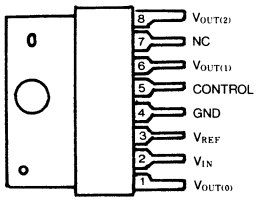
Block Diagram



■MB3756 051-0526-00 Constant-voltage Source

MB3756 is an monolithic integrated circuit for a constant-voltage power source. It has 3 output terminals. With these 3 output terminals, it is possible to obtain the stabilized output of an alternate changeover function by an external control signal. Noises, which tend to be generated by changeover, is prevented by an internal circuit, thus making easy the changeover of transmission/reception and AM/FM in CB.

Terminal Layout (Top View)



Maximum Ratings (T_A=25°C)

Item	Symbol	Rating	Unit
Supply voltage	V_{IN}	18	V
Power dissipation	P_D	1*	W
		4**	W
Operating temperature	T_{OP}	−20~+75	°C
Storage temperature	Tstg	−55~+125	°C

* No Heat Sink $T_A \leqq 70°C$
** Infinite Heat Sink $T_C \leqq 70°C$

Electric Characteristics (T_A=25°C, V_{IN}=14V, $R_{L0}=R_{L1}$=200Ω, R_{L2}=100Ω)

Item	Symbol	Condition	Min	Typ	Max	Unit
Bias current	I_B	V_{IN}=18V	–	6	10	mA
Ripple suppression		f=100Hz	–	60	–	dB
Output noise voltage		10Hz≦f=100kHz, C_R=10μF	–	40	–	μV
Min. I/O voltage difference	$V_{IN}-V_O$		–	1.7	–	V
Output voltage	$V_{O1(L)}$	V_{IC}=0.8V	0	–	0.2	V
(control input at L level)	$V_{O2(L)}$	V_{IC}=0.8V	7.8	8.2	8.6	V
Output voltage	$V_{O1(H)}$	V_{IC}=2.0V	7.8	8.2	8.6	V
(control input at H level)	$V_{O2(H)}$	V_{IC}=2.0V	0	–	0.2	V

■μPD1708G-219-03 051-0731-00 PLL Synthesizer Tuner Controller

I Features

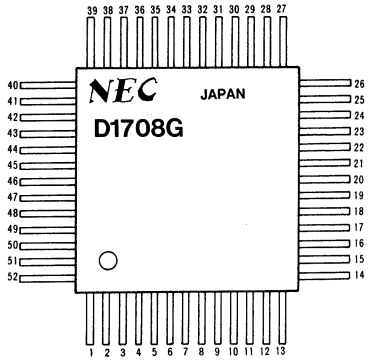
1. Single power source of 5V±10%
2. Enables LCD direct drive. (1/2 duty, 1/2 bias drive)
   Frame frequency : 100Hz
3. Incorporated with a prescaler, a phase comparator and a programmable devider.
4. Incorporated with a 12-/24-hour-display clock function.
5. Enables independent 6-station preset memory of FM (FM 1/FM 2), MW and LW by operating 6 buttons.
6. Manual up/down and auto up/down (scan/seek) tuning (saw-tooth wave tuning).
7. Enables auto VF retuning and auto retuning
8. Incorporated with an auto preset memory function and á preset memory scan function within a band.
9. One each of last channel memory FM (FM 1/FM 2), MW and LW.
10. Enables auto tuning of ARI (transportation information).
11. Enables STEREO and SK display.
12. Preset memory display (numerical value display).

II Receivable Frequency

Destination	Band	Frequency Range	Channel Space Manual	Channel Space Auto	Reference Frequency	Intermediate Frequency
Europe 1	UKW	87.5~108.00MHz	50kHz	50kHz	25kHz	+10.700 +10.750 MHz
	MW	531~1,602 kHz	9kHz	9kHz	9kHz	+459 kHz
	LW	153~281 kHz	1kHz	9kHz	1kHz	+459 kHz
Europe 2	MW	531~1,602 kHz	9kHz	9kHz	9kHz	+459 kHz
	LW	153~281 kHz	1kHz	9kHz	1kHz	+459 kHz
Europe 3	UKW	87.5~108.00MHz	50kHz	50kHz	25kHz	+10.700 +10.750 MHz
	MW	531~1,602 kHz	9kHz	9kHz	9kHz	+459 kHz
U.S.A. 1	FM	87.9~107.9 MHz	200kHz	200kHz	25kHz	+10.700 +10.750 MHz
	MW	530~1,610 kHz	10kHz	10kHz	10kHz	+450 kHz
U.S.A. 2	FM	87.9~107.9 MHz	200kHz	200kHz	25kHz	+10.700 +10.750 MHz
	MW	530~1,610 kHz	10 kHz	10kHz	10kHz	+450 kHz
Australia & Middle East 1	FM	87.9~107.9 MHz	100kHz	100kHz	25kHz	+10.700 +10.750 MHz
	MW	531~1,602 kHz	9kHz	9kHz	9kHz	+450 kHz
Australia & Middle East 2	FM	87.9~107.9 MHz	100kHz	100kHz	25kHz	+10.700 +10.750 MHz
	MW	531~1,602 kHz	9kHz	9kHz	9kHz	+450 kHz
Japan	FM	76.1~89.9 MHz	100kHz	100kHz	25kHz	−10.700 −10.650 MHz
	MW	522~1,629 kHz	9kHz	9kHz	9kHz	+450 kHz

III Terminal Functions

(1) Terminal Connection Diagram (Top View)



PIN NO.	TERMINAL	PIN NO.	TERMINAL
1	LCD4	52	LCD 5
2	LCD3	51	LCD 6
3	LCD2	50	LCD 7
4	LCD1	49	LCD 8
5	COM2	48	LCD 9
6	COM1	47	LCD10
7	V_{DD}	46	LCD11
8	FM	45	LCD12
9	AM	44	LCD13
10	GND	43	LCD14
11	EO_1	42	LCD15
12	EO_2	41	LCD16
13	CE	40	LCD17
14	NC	39	LCD18
15	XI	38	LCD19
16	XO	37	LCD20
17	PA_3 MUTE OUTPUT	36	LCD21
18	PA_2 ST ON/OFF	35	LCD22
19	PA_1 FM BAND	34	LCD23
20	PA_0 AM BAND	33	※V_{DD}
21	K_3	32	PC_0 LO/DX
22	K_2 —KEY INPUT	31	PC_1
23	K_1	30	PC_2 —KEY OUTPUT
24	K_0	29	PC_3
25	PB_3 —KEY OUTPUT	28	PB_0
26	PB_2	27	PB_1

※To be internally connected to the pin 7

(NC : No Connection)

(2) Description of Terminal Functions

Pin No.	Symbol	Terminal name	Function	Output system
34 ~ 52	LCD23 ~ LCD5	LCD Segment Output	SEGMENT signal output terminals to the LCD panel. Up to 46-dot display is available by the matrix with COM 1 and COM 2. Output is made to these terminals by executing LCDD instruction. (Note) When the power is turned on (V_{DD}=Low→High), or when CKSTP instruction is executed, a Low-level signal is automatically output (DISPLAY OFF mode).	CMOS push-pull
1 ~ 4	LCD4 ~ LCD1			
5	COM2	LCD Common Output	COMMON signal output terminals to the LCD panel. Up to 46-dot display is available by the matrix with LCD1 through LCD23. Three kinds of values, such as GND, 1/2 V_{DD} and VDD, are output on 50Hz (at intervals of 5ms). Between these terminals and LCD1 through LCD23, there will light up segments which have a potential difference of ±VDD. (Note) When the power is turned on (V_{DD}=Low→High), or when CKSTP instruction is executed, the Low-level signal is automatically output (DISPLAY OFF mode).	CMOS push-pull
6	COM1			
7, 33	V_{DD}	Power Supply	Device power terminals. When the device is operating, the voltage of 5V±10% is supplied. When holding (when executing CKSTP instruction) the internal data memory (RAM), the voltage can be lowered down to 2.5V. (Note) Since the pins 7 and 33 are connected inside the chip, the device will operate, if the voltage is supplied to either of them.	
8	FM	FM Local Oscillation Signal Input	Inputs local oscillator output (VCO output) from 10MHz to 150MHz (min. 0.5Vp-p). Incorporated are a 1/2 fixed frequency devider prescaler, and 1/32 and 1/33 two-modulus prescalers. Since an AC amplifier is integrated, it is necessary to input by cutting by a condenser.	Input
9	AM	AM Local Oscillation Signal Input	Inputs local oscillator output (VCO output) from 0.6MHz to 50MHz (min. 0.3Vp-p). This terminal becomes active, being selected in direct frequency division. Since an AC amplifier is integrated, it is necessary to input by cutting by a condenser.	Input
10	GND	Ground	Device ground terminal.	

Pin No.	Symbol	Terminal name	Function	Output system
11 12	EO_1 EO_2	Error Outputs	PLL error output terminals. If a divided local oscillation frequency (VCO output) is higher than a reference frequency, the High level will be output from these terminals, and it is lower, the Low-level signal will be output. If they coincide with each other, a floating state will be created. Since the same waveform is output to EO1 and EO2, either terminal can be freely selected for use.	CMOS three-state
13	CE	Chip Enable	Inputs a device selection signal. When operating the PLL unit, set to the High level, and when stopping it, set to the Low level. If set to the Low level, the display will become blank. However, the Low level lower than 134μs or the High level is not accepted. If this terminal is set to the Low level in NO CLOCK mode, BACKUP mode will go into effect, thus enabling backup by a low-consumption current. (max. 10μA) All output terminals turn to Low, when this terminal is at the Low level.	Input
14	NC		Unused terminal. It can be arbitrary connected to OPEN, GND, V_{DD}, and so on.	
15 16	XI XO	X'tal	Connection terminals for the quartz oscillator. Connect 4.5MHz quartz. Adjust an oscillation frequency (4.5 MHz), observing the XO terminal.	Input CMOS
17	MUTE	MUTE Output	MUTING signal output terminal for eliminating shock noises when the PLL unit is unlocked, and popping noises when taping. Low active. (CMOS output)	CMOS push-pull
18	ST ON/OFF	Stereo/ Monaural Selector Output	Stereo/monaural selector output terminal (only for FM). High level when stereo is on, and Low level when it is off (forced monaural). Corresponds to the STEREO ON/OFF key. Stereo is on at the High level when V_{DD} is on.	CMOS push-pull
19 20	FM BAND AM BAND	Band Selector Signal Output	Band selector signal output terminal (CMOS output). A signal is output as follows. ("1" for High level, and "0" for Low level) TERMINAL / BAND: FM BAND: 1 0; MW: 0 0; LW: 0 1; VF: 1 1 *VF (in case of VF mode with FM band)	CMOS push-pull
21 〜 24	K3 〜 K0	Key Return Signal Input	Key return signal input terminal of the key matrix. Attach pull-down resistance. (CMOS input)	Input
25 〜 31	KS0 〜 KS6	Key Return Signal Source	Key return signal output terminal of the key matrix. (CMOS output)	CMOS push-pull
32	AUTO LOCAL/DX	AUTO LOCAL/ DX Output	AUTO LOCAL/DX terminal in seeking. Effective for all bands of FM, MW and LW. High level in LOCAL mode, and Low level in DX mode. Normally, the low-level signal (DX mode) is output.	CMOS push-pull

Ⅳ Key Matrix

	K3	K2	K1	K0
KS0 PB3	MUP	M DOWN	STEREO ON/OFF	RECALL
KS1 PB2	SEEK UP	SEEK DOWN	SCAN UP	P · SCAN A · MEMO
KS2 PB1	M1	M2	M3	M4
KS3 PB0	M5	M6	VF/A·R	BAND
KS4 PC3	SK	ST	SD	FOR/REV
KS5 PC2	TAPE/RADIO	AREA0	AREA1	AREA2
KS6 PC1	ARI	CLOCK	IFO	DSPSEL

: Momentary switch

: Transistor switch

: Diode switch (short-circuited or opened by a diode)

§1 Diode Switches

In the following table, "0" denotes the diode switch being turned off (open), and "1" it being on (short-circuit).

Symbol	Function
AREA0 AREA1 AREA2	These switches are used for setting a destination. Each destination and bands are determined by the following combination. AREA2 / AREA1 / AREA0 / Region / Bands: 0 0 0 Europe 1 UKW/MW/LW 0 0 1 Europe 2 MW/LW 0 1 0 Europe 3 UKW/MW 0 1 1 Japan FM/MW 1 0 0 U.S.A. 1 FM/MW 1 0 1 U.S.A. 2 FM1/FM2/MW 1 1 0 Australia & Middle East 1 FM/MW 1 1 1 Australia & Middle East 2 FM1/FM2/MW Each band is selected as follows by the BAND key. Europe 1 →UKW→MW→LW→ Europe 2 →MW→LW→ Europe 3 →UKW→MW→ Japan, U.S.A. 1, Australia & Middle East 1 →FM→MW→ U.S.A. 2, Australia & Middle East 2 →FM1→FM2→MW→
ARI	This switch turns on/off ARI mode. With the FM band selected, if this switch is "1" and VF ON mode is selected, TRANSPORTATION INFORMATION OFFICE SEARCH mode will be set, and if the SEEK key, etc. are turned on, the transportation information office (VF) will be searched. If this switch is "0", regular auto tuning will be performed.
CLOCK	This switch turns on/off the clock. If "1" (on), the clock function will be turned on. If "0" (off), the clock function will be turned off. When this switch is "1" (on), a clock display type (12-hour display + a.m., p.m. : 24-hour display) Europe 1, 2 and 3 24-hour display Japan, U.S.A. 1 & 2, Australia & Middle East 1 & 2 12-hour display
DSPSEL	This switch selects a display in taping. It also enables and disables the RECALL key in taping. Its selection (enabled or disabled) is as follows depending on a combination with the diode switch "CLOCK". DSPSEL / CLOCK / Display in Taping / RECALL Key Status: 0 0 Frequency display Disabled 0 1 Clock display Only clock adjustment enabled 1 0 No display Disabled 1 1 Frequency display Enabled
IFO	This switch selects FM's intermediate frequency. The intermediate frequency is set as follows by turning on/off this switch. IFO / Region: Intermediate Frequency in Region Other Than Japan / Intermediate Frequency in Japan: 0 +10.700MHz −10.700MHz 1 +10.750MHz −10.650MHz

§ 2 Transistor Switches

In the following table, "1" denotes the transistor switch being on (base at the High level), and "0" it being off (base at the Low level).

Symbol	Function
TAPE/ RADIO	This switch selects TAPE/RADIO mode. If "0" (off), it will be RADIO mode. If "1" (on), it will be TAPE mode. Combining this switch with the diode switches "CLOCK" and "DSPSEL", the display in each mode can be changed over as follows.

CLOCK	DSPSEL	Changeover	Display before Changeover	Display after Changeover
0	0	R→T	Frequency	Frequency
		T→R	Frequency	Frequency
0	1	R→T	Frequency	No display
		T→R	No display	Frequency
1	0	R→T	Frequency	Clock
		R→T	Clock	Clock
		T→R	Clock	Frequency
1	1	R→T	Frequency	Frequency
		R→T	Clock	Clock
		T→R	Frequency	Frequency
		T→R	Clock	Clock

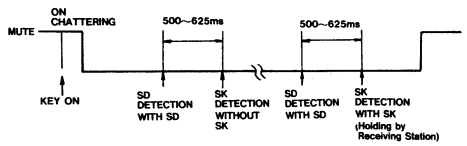
*In the above-mentioned table, R denotes RADIO mode, and T TAPE mode.

SK

This switch is to be turned on when the transportation information office was received. The reception of the transportation information office is enabled when the result of STOP signal in VF search ANDed with SD signal is 1. If this switch is turned on in the FM band, SK will be displayed on the LCD panel.
For sampling of this signal, the following 4 types are available. (only the FM band in radio reception)

(1) Sampling is performed at intervals of 2.5ms in regular reception. If the switch status changes, it will be turned on or off with SK displayed.

(2) When the initial setting diode matrix "ARI" is on and VF is on, if the AUTO TUNING key is pressed, the transportation information office (VF) will be searched and sampling will be performed as shown in the following chart as the then STOP signal.



(3) With ARI and VF turned on, when the frequency is changed by means of a key or switch other than the AUTO TUNING key (including when changed from MW or LW to FM), it makes a check together with SD about 600ms after outputting an N value.
As a result, if SD=SK=1 (High level), the very station will be received. Otherwise (when the AND of SD and SK is 0), seek-up tuning will be performed.

(4) When ARI and VF are on, sampling is performed at intervals of 10ms. As a result, if the Low level is detected for a fixed time (24 seconds), VF tuning will be performed.

ST

This switch inputs a signal for lighting the FM band stereo indicator.
In radio reception, sampling is performed at intervals of 2.5ms. If the switch status changes, ST display on the LCD panel will be turned on and off.

SD

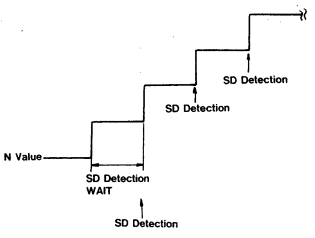
Station detector input switch in auto tuning. If this is turned to the High level, it will be judged that broadcasting was received. However, it is necessary to make an input within 25ms for FM, 55ms for MW and 70ms for LW after locking of PLL after a frequency division ratio changed.

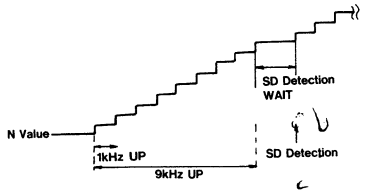
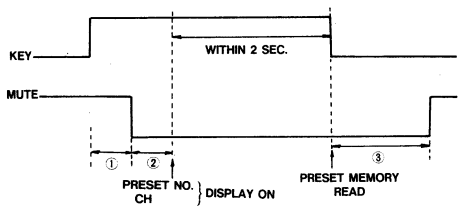
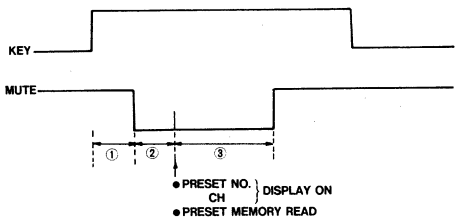
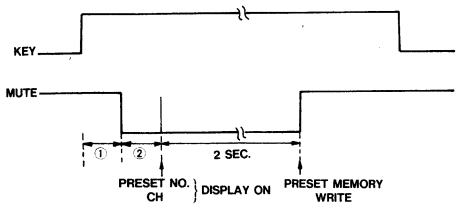
FOR/ REV

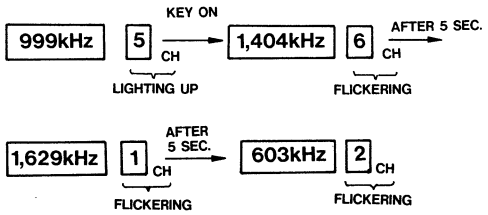
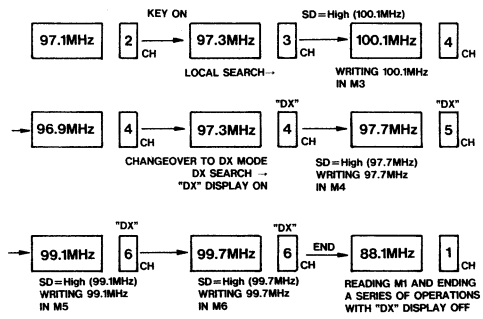
Tape run detection switch.
Sampling is performed at intervals of 2.5ms in TAPE mode. It the switch status changes, the tape run display on the LCD panel will be reversed. Details are as follows.

Switch Status	Tape Running Direction	Display
ON	FORWARD	◁
OFF	REVERSE	▷

§ 3 Momentary Switch

Symbol	Function
M · UP M · DOWN	Channel up/down keys. Every time these keys are pressed, the frequency is increased by 1 step (M · UP) or decreased by 1 step (M · DOWN). If kept pressed for 0.5 second or more, fast forwarding will be performed at the following intervals until each switch is released. About 52ms for FM About 82ms for MW About 82ms for LW If the M · UP key is pressed at the upper limit frequency, a jump will be made to the lower limit frequency. If the M · DOWN key is pressed at the lower limit frequency, a jump will be made to the upper limit frequency. In CLOCK DISPLAY mode, clock adjustment is enabled by pressing either of these keys together with the RECALL key. An adjustment method is as follows. First, press the RECALL key. With the RECALL key turned on, pressing the M · UP key increases the digit of minute, and pressing the M · DOWN key increases the digit of hour. If kept pressed for 500ms or more, the digit of minute will be increased by 1 minute every 125ms, and the digit of hour by 1 hour every 250ms. If the digit of minute is adjusted, the digit of second will be cleared to "00", and nothing will be carried to the digit of hour. On the other hand, counting continues while adjusting the digit of hour, without affecting the digits of minute and second. Note) The clock can be adjusted only in an incremental way. As another function, it is possible to change over the stop frequency at the time of the auto tuning of the LW band by pressing either of these keys together with the ST key while receiving the LW band. While the frequency is displayed in the LW band (disabled while the clock is displayed), press the ST key first. Then, if the M · UP key is pressed in this state, the stop frequency will come to 9N+2 (integer for N), and if the M · DOWN key is press, it will come to 9N. (When the power is turned on, VDD (Low→High) is set to 9N+2.) The below-mentioned are examples when the stop frequency is changed. 〈Before Changeover ; 9N+2〉 155kHz → (SEEK-UP Key ON) → 164kHz (SD Detection SD=Low) → 218kHz (SD Detection SD=High) 〈After Changeover ① ; 9N〉 ST and M · DOWN keys ON 218kHz → (SEEK-UP Key ON) → 225kHz (SD Detection SD=Low) → 270kHz (SD Detection SD=High) 〈After Changeover ② ; 9N+2〉 ST and M · UP Keys ON 270kHz → (SEEK-UP Key ON) → 272kHz (SD Detection SD=Low) → 173kHz (SD Detection SD=High)
SEEK · UP SEEK · DOWN	Auto tuning keys. When both ARI and VF are turned on, the transportation information office (VF) is searched. When either of them is turned off, a regular broadcasting station is searched. If these keys are pressed, a search will be made in LOCAL mode in the up direction (SEEK-UP) and the down direction (SEEK-DOWN) respectively from the frequency currently received. As a search result, if the station cannot be found even by returning to the frequency from which the search was initially started, the search will be made in DX mode from the next time, skipping the first frequency. If returned to the first frequency again, this time, SD detection will be performed on it. While searching in LOCAL mode, if the same key is pressed, the search will be made in DX mode from the frequency next to the first one. Since the frequency may greatly change in this case, WAIT of 250ms to 375ms is provided before detecting SD after outputting an N value (frequency division ratio), same as in case of the changeover from the upper limit frequency to lower limit frequency and vice versa. In DX search, DX is displayed on the LCD panel. While searching for the transportation information office, if SD and SK signals are input at the High level, both of them will stop at the very frequency. In regular SEARCH mode, only SD signal stops at the High level. If stopped in DX search, the DX display will go off and a reception mode will be forcibly turned to DX mode, including when stopped in LOCAL search. In the FM, MW and LW bands, a seeking method and the fluctuating state of the frequency division ratio (N value) will differ respectively as follows. 〈FM and MW Bands〉 (SEEK-UP Mode) 

Symbol	Function
SEEK · UP SEEK · DOWN	Every time one-channel space is increased (50kHz for FM, and 9kHz for MW), SD is detected. 〈LW Band〉 (SEEK-UP Mode)  In the abovementioned case, the first frequency is the stop frequency in AUTO mode. Since a channel space varies from MANUAL mode (1kHz step) to AUTO TUNING mode (9kHz step), the frequency division ratio (N value) is changed by 1kHz in SEEK-UP mode in the same manner as in MANUAL TUNING mode. However, SD detection is carried out only in AUTO TUNING mode with the stop frequency at 9N kHz and 9N+2kHz.
SCAN · UP	Auto tuning key. Its functioning is similar to that of the SEEK-UP key. Differences are as follows. (1) Finds the broadcasting station and holds its frequency for 5 seconds. Meanwhile, if no key is pressed, auto tuning will restart. (2) When the broadcasting station was found in DX search, DX is not displayed while 5-second holding by the receiving station. (3) When the broadcasting station was found as a result of tuning and it is desired to stop tuning at the very station, press this key again during 5-second holding. This way, the very station can be held. (When this is done, if the DX has been displayed, it will go off at this time.) (4) During 5-second holding, the frequency display and "kHz" or "MHz" display flicker by 1Hz.
M1, M2 M3, M4 M5, M6	Preset memory write and read keys. FM, MW and LW can be independently memorized for each button. However, the number of bands depends on a region set by the initial diode matrix; 6 stations×2=12 stations for a 2-band region, and 6 stations × 3 = 18 stations for a 3-band region. 〈When Reading Frequency〉 For example, if the M1 key is pressed and released within 2 seconds with the FM1 band selected, the frequency memorized there will be read upon its release. When pressed during auto tuning, clock display in RADIO mode and radio reception in TAPE mode (when the initial diode matrix CLOCK and DSPSEL are turned on or off), the frequency will be read upon pushing it, because writing is prohibited. Including the former case as well, the moment the key is turned on, PRESET NO. and CH, which is receiving the preset memory, light up. The read timing charts of both cases are shown on the next page. (1) During frequency display in RADIO mode (other than auto tuning) (2) During radio reception other than (1) (1)  ① KEY-ON CHATTERING PREVENTION TIME ② FIRST-OUT MUTE TIME ③ LAST-OUT MUTE TIME (2)  〈When Writing Frequency〉 For example, if the M3 key is pressed for 2 seconds or more with the MW band selected, the frequency currently displayed will be written in M3. On the contrary, frequency writing is disabled during clock display in radio reception, auto tuning and radio reception in TAPE mode. The following shows a write timing chart.  ① KEY-ON CHATTERING TIME ② FIRST-OUT MUTE TIME

Symbol	Function
P · SCAN A · MEMO	Preset scan and auto memory key. This key has two functions which can be differentiated by how long it is pressed. 〈Preset Scan Function〉 If this key is pressed and released within 2 seconds, scanning will start from the next preset station when a preset station has been selected within the band currently received from there (with "PRESET CHANNEL NO." and "CH" displayed), and otherwise (with "PRESET CHANNEL NO." and "CH" not displayed), scanning will start from M1. Holding the very station for 5 seconds after reading, and shifting to the next preset memory, scanning is repeated from M1 to M6 until another key is pressed. It returns to M1 after M6. During 5-second holding, "PRESET CHANNEL NO." and "CH" flicker by 1Hz. When this key is pressed during auto tuning, clock display in RADIO mode and radio reception in TAPE mode (both initial diode matrixes CLOCK and DSPSEL are turned on or off), preset scan is performed upon pressing it, because the auto memory function is disabled. If this key is pressed again during preset scan, it will stop. (The contents of the then preset memory will be held.) And then, the display of "CHANNEL NO." and "CH" will light up. If the ST and VF key are pressed, preset scan will not stop, enabling respective key processings. However, when other momentary key (except for the RECALL key, because it is disabled) is pressed, preset scan will end and operation will proceed to respective key processings. (Preset Scan Example) M5=999kHz M6=1,404kHz M1=1,629kHz M2=603kHz  〈Auto Memory Function〉 If this key is kept pressed for 2 seconds or more, a station will be searched from the next preset station when a preset station has been selected (with "PRESET CHANNEL NO." and "CH" displayed), and otherwise (with "PRESET CHANNEL NO." and "CH" not displayed), from M1 in the up direction from the frequency currently received. If the station was found (when both SD and SK turn to the High level in case both ARI and VF are on, and when only SD turns to the High level in a normal mode), the frequency will be written in the memory of the preset No. currently displayed, continuing frequency writing up to M6. (During auto tuning, clock display in RADIO mode and radio reception in TAPE mode, the auto memory function will not work, even if this key is pressed. Instead, preset scan will be performed.) As an auto memory operating method, perform a search in LOCAL mode first. When it comes to the frequency from which the search was started, keep searching in DX mode from the next step. If this key is pressed again while searching in LOCAL mode, the search will be performed in DX mode from the next step (1,008kHz when started from 999kHz with the MW band initially selected) to the frequency from which it was initially started. When pressed while searching in DX mode, the auto memory function will stop, reading M1. (Auto Memory Example) U.S.A. FM M1=88.1MHz  In AUTO MEMORY mode, if the VF and ST keys are pressed, the auto memory function will not stop, enabling respective key processings. However, if other momentary key (except for the RECALL key, because it is disabled) is pressed, the auto memory function will end and operation will proceed to respective key processings.

Symbol	Function
BAND	Receivable band selector key. Every time this key is pressed, a receivable band changes as follows depending on a destination. Destination / Band Changeover Europe 1 : →UKW→MW→LW→ U.S.A. 2, Australia & Middle East 2 : →FM1→FM2→MW→ Europe 2 : →MW→LW→ Europe 3 : →UKW→MW→ U.S.A. 1, Australia & Middle East 1 & Japan : →FM→MW→ For example, if the band is changed over in case of Europe 1, it will go as follows: KEY ON KEY ON KEY ON KEY ON UKW →MW →LW →FM →MW It returns to FM after LW. Also, every time the band is changed over, a band selector signal is output as shown in the following table. Band \ Terminal / FM BAND / AM BAND FM(UKW) / 1 / 0 MW / 0 / 0 LW / 0 / 1 VF / 1 / 1 *VF : When VF is turned on with the FM band selected.
VF	This key is for setting a mode which detects a VF (transportation information) search and the deterioration of state of an auto retuning receiving station and automatically performs seek-up operation. This key is enabled only in the FM (UKW) band. If this key is pressed, the "VF" display and AM BAND (pin No. 20) will be reversed, and a high-level signal will be output when the "VF" display is on (VF ON mode), and a low-level signal when the "VF" display is off. When returned to the FM band again after changing over the band, the contents of VF have been held. On the other hand, if the AUTO TUNING key is pressed with VF ON mode selected and the initial setting diode matrix ARI turned on, the transportation information office will be searched. The functioning for detecting the deterioration of receiving state is as follows: If this key is turned on ("VF" display lit up) in FM mode, SD and SK signals will be checked in ARI mode (ARI=1). If both of them are at the High level, the very frequency will be held. However, if either of them is at the Low level, VF retuning will be performed (seek-up). In ARI OFF mode, only SD signal is checked and auto retuning (seek-up) is performed at the Low level. Even though some signals are input at the High level in VF ON mode, if more than half of signals are counted as Low-level ones (both of SD and SK or either of them is at the Low level in VF RETUNE mode, or SD at the Low level in AUTO RETUNE mode) more than half of them by 2-second-interval sampling (200 times of check at intervals of 10 ms), and if they are detected for 12 times running, seek-up (retuning) will be performed. During 2-second sampling, if the number of Low-level counts is less than half (less than 100 times), new 2-second-interval sampling will be repeated 12 times from there for 24 seconds. For example, if the number of low-level counts during 2 seconds after duration of the Low level for 16 seconds (2 seconds × 8 times) is less than half, 8 times of counts made so far will be cleared and new counting will start. On the other hand, when the frequency changed (by reading the preset memory or pressing the M · UP/DOWN key) within the FM band in VF ON mode (with "VF" display turned on), if SD and SK signal levels are checked (only SD in AUTO RETUNE mode) after waiting 525ms to 650ms after detecting a lock, and if they are at the Low level seek-up (retuning) will be performed at the time. If they are at the High level, 2-second-interval sampling will be performed from there. When the band was changed over to FM from one other than this, if a previously set mode is VF ON mode, the same processing as the above-mentioned will be performed. The same applies when changed over to RADIO mode from TAPE mode without frequency display (mode which turns off PLL in TAPE mode, when the initial diode matrixes CLOCK and DSPSEL are 1 and 0, or 0 and 1 respectively). When changed over to CLOCK DISPLAY mode by the RECALL key, VF counting is suspended during clock display. Then, if returned to FREQUENCY DISPLAY mode, suspended counting will resume. Every time this key is turned on and off, AM BAND (pin No. 20) output is reversed. In VF ON mode : High-level output In VF OFF mode : Low-level output
ST ON/OFF	FM band stereo/monaural selector key. Every time this key is pressed with the FM band selected, STEREO and MONAURAL modes can be changed over between them. Initially (VDD : Low→High), it has been turned on, that is, STEREO mode. As status output signals to the exterior, ST ON/OFF (pin No. 18) output and lighting on/off of the "ON" display on the LCD panel are available. KEY STATUS / ST ON/OFF (PIN NO. 18) / "ON" DISPLAY STEREO ON / High level / ON STEREO OFF / Low level / OFF Even though this key is pressed during auto tuning, STEREO/MONAURAL mode can be changed over without stopping tuning operation. As another function, this key can be used for changing over the stop frequency at the time of auto tuning of the LW band by pressing together with M · UP or M · DOWN key, when the LW band is selected (disabled during clock display). For details, refer to the description of M·UP and M·DOWN.
RECALL	Frequency/clock display selector key. Every time this key is pressed during radio reception, the display is changed over. It is changed over when the key is released, but not when it is pressed. Clock adjustment is enabled by pressing this key together with the M·UP or M·DOWN key. For details, refer to the description of M · UP and M · DOWN. When the clock adjustment was made, the frequency display does not appear even by releasing the RECALL key. It does when the RECALL key is pressed again and released. This key is disabled during auto tuning.

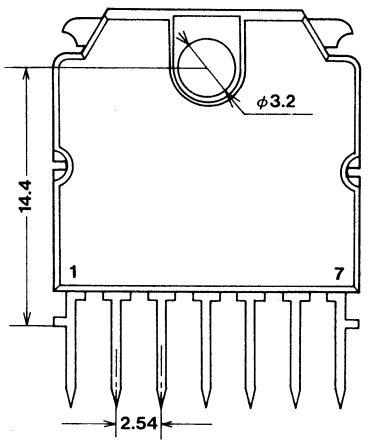
V Display

- There are the following 5 display patterns.

(1) Europe 1
3 kinds of bands such as UKW, MW and LW. 24-hour display if the clock is provided.
(2) Europe 2
2 kinds of bands such as MW and LW. 24-hour display if the clock is provided.
(3) Europe 3
2 kinds of bands such as UKW and MW. 24-hour display if the clock is provided.
(4) U.S.A. 1, Australia & Middle East 1 & Japan
2 kinds of bands such as FM and MW. 12-hour display if the clock is provided.
(5) U.S.A. 2, Australia & Middle East 2
3 kinds of bands FM 1, FM 2 and MW. 12-hour display if the clock is provided.

■TA7274P 051-0735-00 Voice signal power amplifier (BTL 12W)

Figure



Absolute Maximum Ratings (Ta=25°C)

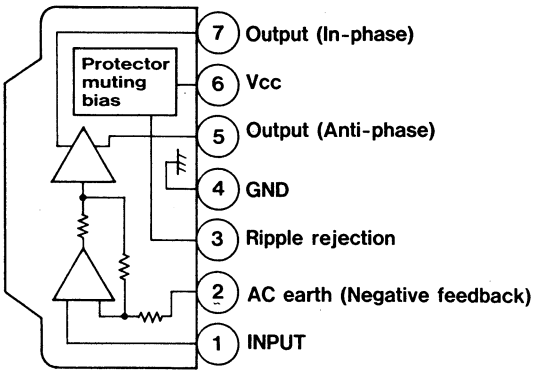
Operating supply voltage	Vcc opr	18V
Output current (Instantaneous value)	Io (peak)	4.5A
Allowable power dissipation	P_D	15W

Electrical Characteristics

(Unless otherwise specified, Vcc=13.2V, f=1kHz, R_L=4Ω, Ta=25°C)

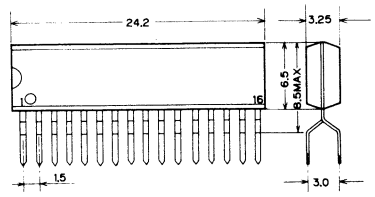
Item	Symbol	Measuring condition	Min.	Typ.	Max.	Unit
Non-signal current	I_{CCO}	V_{IN}=0	—	80	—	mA
Output power	P_{OUT}	THD=10%	10	12	—	W
Total harmonic distortion	THD	P_{OUT}=5W	—	0.4	—	%
Voltage gain	G_V	Rf=0Ω	51.5	53.5	55.5	dB
Output noise voltage	V_{NO}	Rg=10kΩ, BW=20Hz~20kHz	—	0.9	2.0	mVrms
Ripple rejection	R·R	f_{ripple}=100Hz, Rg=600Ω	—	50	—	dB
Input resistance	R_{IN}	f=1kHz	—	30	—	kΩ
Output offset voltage	Voffset	V_{IN}=0	—	0	0.3	V

Terminal Connection Diagram and Block Diagram



■LA1170 051-0737-00 FM Front End (Tentative Standards)

Appearance:



Functions and Features

- Double balance type mixer (improvement of sprious characteristic)
- Keyed AGC (improvement of mutual modulation and cross modulation characteristics)
- Differential IF amplification (improvement of limiting characteristic)
- Built-in buffer amplifier for oscillation and local oscillation (for electronic tuning setting)

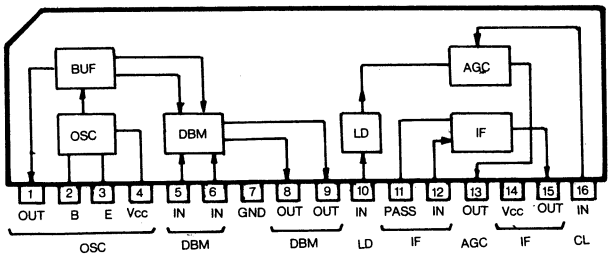
Operating Characteristics (Ta=25°C, Vcc(L)=8V, Vcc(H)=12V, fr=88MHz, fosc=98.7MHz)

			min	typ	max	unit
Current consumption	I_{CCL-0}	Vi=0dBμ		17.7		mA
	$I_{CCL-100}$	Vi=100dBμ, V_{CL}=4V		19.5		mA
	I_{CCH}	Vi=0dBμ		6.0		mA
Mixer input offset voltage	V_{IMIX}			0±15		mV
Mixer output offset current	I_{OMIX}			0±450		μA
High-level AGC output	V_{AGCH}	Vi=0dBμ, V_{CL}=4V		7.9		V
Low-level AGC output	V_{AGCL}	Vi=100dBμ, V_{CL}=4V		0.22		V
AGC control input	V_{CL7}	Vi=100dBμ, V_{AGC}=7V		0.22		V
	V_{CL2}	Vi=100dBμ, V_{AGC}=2V		1.5		V
IF input resistance	r_{IN}			330±50		Ω
Voltage gain	VG	Vo=100dBμ		20		dB
Input limiting voltage	Vi_{lim}	Vi=110dBμ		90±3		dBμ
AGC input voltage	Vi_{AGC}	V_{CL}=4V, V_{AGC}=2V		72±4		dBμ
Saturated output voltage	Vo	Vi=110dBμ		111		dBμ
Local oscillation buffer output voltage	VoscBuff	R_L=1kΩ		111		dBμ

Reference Characteristic

IF interference ratio	IFR	10.7MHz		33		dB

Equivalent Circuit Block Diagram



Functions

(1) SK operation : LED display through AND using 57kHz (SK) and 23.75 to 53.98Hz (BK).
Voice output control (Muting) through AND using above frequencies.

(2) MUTING SW : When Pin 4 is set to GND, signal is put in the through mode regardless existence of SK and BK. LED display is available in the SK and BK operations.

(3) OSC-STOP SW : When voltage (5V to Vcc −1.4V) is applied to Pin 20, the oscillating circuit stops and signal is put in the through mode. (LED turns OFF).

(4) DK and BK output : The system contains a 57kHz AM detect circuit to send DK and BK signals. In the OSC-STOP mode, the system stops detect operation.

(5) SK-STOP : When frequency of 57kHz (SK) exists, voltage at Pin 16 turns LOW. This function is used as the STOP signal in the auto search mode.
(When 57kHz (SK) exists: V16=0V)
(When 57kHz (SK) does not exist: V16=3.6V)

(6) Turn-ON level control : When voltage is applied to Pin 17, 57kHz (SK) detect level goes upward.
This function is used to prevent LEDs from turning ON with weak signals.

Feature

(1) The system uses 456kHz ceramic oscillator and 57kHz BPF, which have materialized no need of adjustment of the freerun frequency and coil. *
(2) The system contains BK signal detect circuit displaying with LED in the AND operations of SK and BK, in order to prevent malfunction when RDS (or PJ system) is received.
(3) Turn-ON level may be altered by changing C.R installed outside the BPF.
(4) Only SK can be detected in the auto search mode (through SK-STOP terminal at Pin 16).
(5) Turn-ON level may be raised by applying DC voltage (through VL-CONT terminal at Pin 17).

Absolute Maximum Ratings (Ta=25°C)

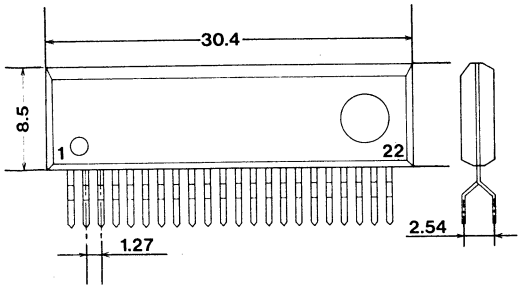
Supply Voltage	Vcc	V_{1-10}	16V
		V_{1-11}	16V
Input Current	Id		1mA
Lamp Drive Current	I_D		30mA
Power Dissipation	P_D		574mW

Electrical Characteristics (Ta=25°C, Vcc=8V, Vin=200mV, L+R=85%, 19kHz=10%, 57kHz=5%, f=1kHz)

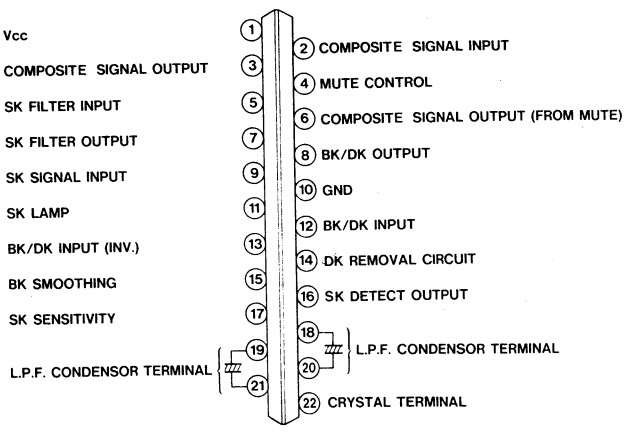
Item	Symbol	Condition	SPEC. MIN	SPEC. TYP.	SPEC. MAX.	Unit
Non-signal current	Icco		17	24	34	mA
Input resistance	r_i		—	40k	—	Ω
SK detect level	V_{SK}	f=57kHz, Input Pin 2	2.5	3.6	5.5	mV
SK Hysteresis	h_{SK}	f=57kHz, Input Pin 2	—	5.5	—	dB
BK detect level	V_{BK}	f=23.75Hz, Input Pin 12	—	17	—	mV
BK hysteresis	h_{BK}	f=23.75Hz, Input Pin 12	—	3	—	dB
Capture range	C.R.	f=57kHz, V_{IN}=10mV	—	±1.2	—	%
Output level	V_{OAF}	f=1kHz, V_{IN}=200mV	147	210	294	mV
DK output level	V_{ODK}	f=57kHz, V_{IN}=10mV, 125Hz, 30%mod.	27	38	54	mV
Total harmonic distortion	THD	f=1kHz, V_{IN}=200mV	—	0.13	0.5	%
Signal attenuation degree	MUTE	f=1kHz, V_{IN}=200mV, DIN/AUDIO filter	−60	−75	—	dB
Free-run frequency	Fo	Pin2 : C=GND at CSB456F11(TYP)	451	454.8	458.5	kHz

■LA2220 051-0739-00 ARI System SK TYPE (Tentative Standard)

Figure



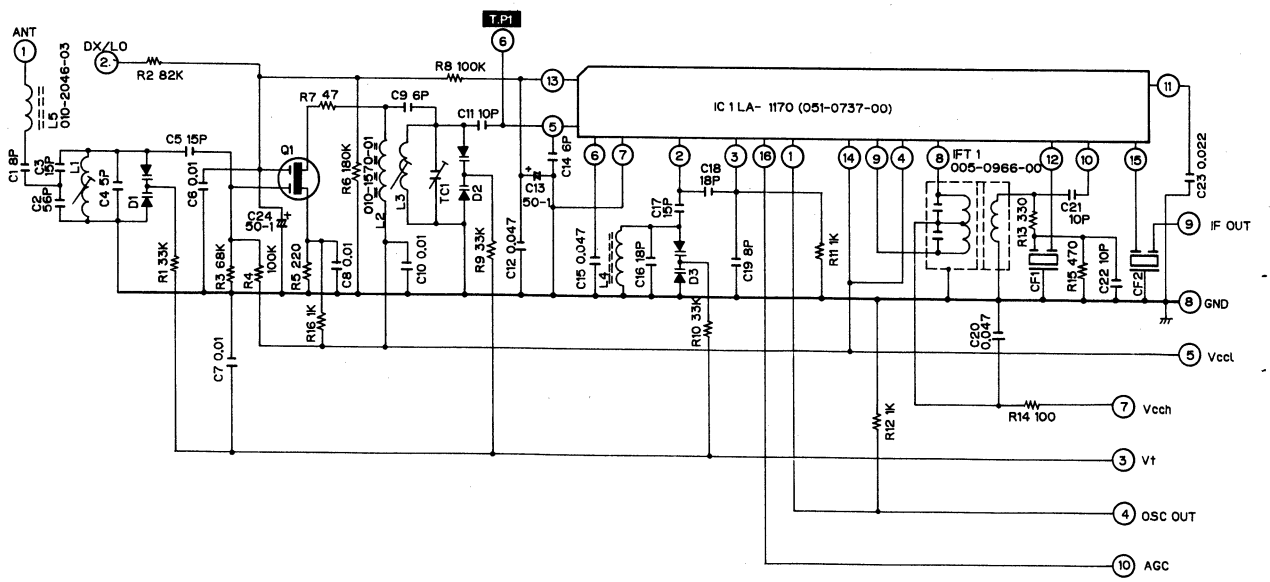
Terminal Connection



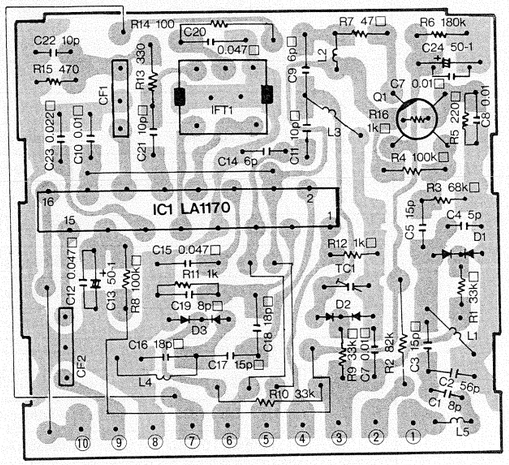
No.	Name of terminal	Function
1	Vcc	Supply terminal. The recommended voltage is 8V.
2	COMPOSITE SIGNAL INPUT	Input of a composite signal.
3	COMPOSITE SIGNAL OUTPUT	Output of a composite signal amplified in the IC.
4	MUTE CONTROL	When no BK/DK signal exists with this terminal set to OPEN, mute is applied to the composite signal output at Pin 6. When this terminal is set to GND, no mute operation is performed.
5	SK FILTER INPUT	Input terminal of filter amplifier for SK signal detection.
6	COMPOSITE SIGNAL OUT (FROM MUTE)	Muting output terminal of composite signal (See description on Pin 4).
7	SK FILTER OUTPUT	Output terminal of filter amplifier for SK signal detection.
8	BK/DK OUTPUT	Output of SK signal detected in the AM mode.
9	SK SIGNAL INPUT	Receives SK signal separated from composite signal.
10	GND	For grounding.
11	SK LAMP	Turns a lamp on when SK and BK signals are detected simultaneously.
12	BK/DK INPUT	Receives BK and DK signals.
13	BK/DK INPUT (INV.)	Inverted input terminal of BK and DK signals. Normally not used.
14	DK removal terminal	Connects L.P.F. condensor to reject DK signal.
15	BK smoothing	Connects L.P.F. condensor to smooth a rectified BK signal.
16	SK DETECT OUTPUT	Sends "High" when SK signal exists.
17	SK SENSITIVITY	Normally set to OPEN. When voltage is applied, SK signal detect sensitivity drops.
18 (21	L.P.F. condensor terminal	Terminal used to connect a condensor constituting L.P.F. When DC voltage of 5V to Vcc −1.4V is applied to Pin 20, V.C.O. stops.
22	Crystal terminal	Connects crystal or ceramic resonator.

■970-0304-00 FM TUNER PACK:

■CIRCUIT DIAGRAM:



■PRINTED WIRING BOARD:



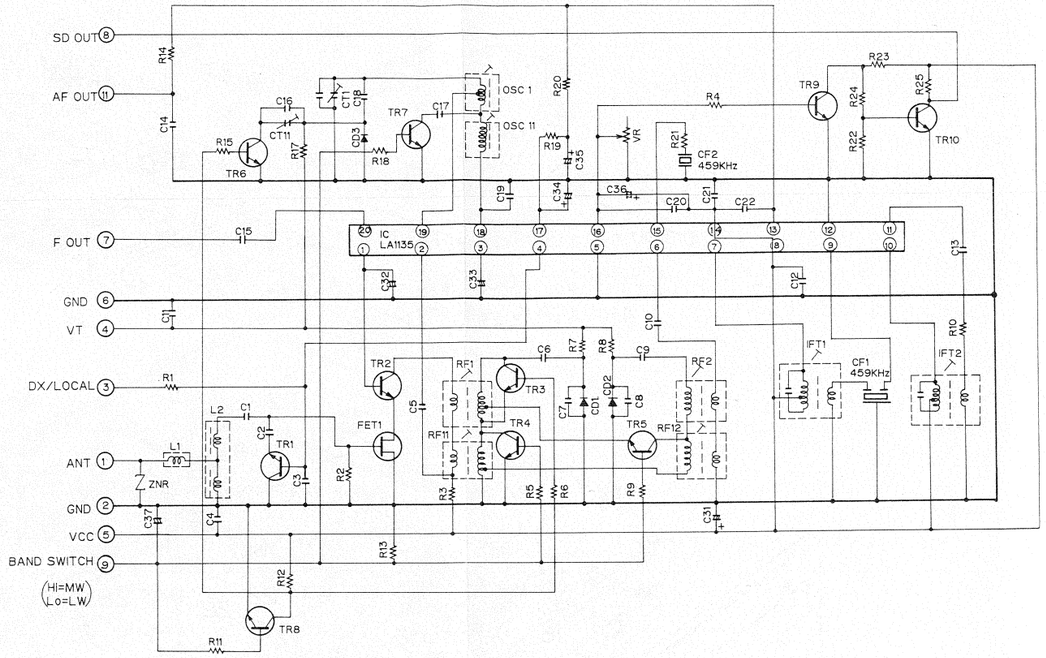
■PARTS LIST:

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
$D_{1\sim3}$	001-0442-00	Diode (1SV147)	3
TC_1	004-1567-00	Trimmer	1
IFT_1	005-0966-00	IF-transformer	1
$CF_{1,2}$	005-0967-00	IF-transformer (MS310.7LK)	2
L_2	010-1570-01	Coil	1
L_5	010-2046-03	Coil	1
L_4	010-2104-00	Coil	1
L_1	010-2105-00	Coil	1
L_3	010-2106-00	Coil	1
IC_1	051-0737-00	IC (LA-1170)	1
Q_1	124-0114-10	FET (3SK-114)	1
$R_{4,8}$	116-1041-10	Chip resistor (1/8W100kΩ)	2
R_{13}	116-3311-10	Chip resistor (1/8W330Ω)	1
$R_{1,9}$	116-3331-10	Chip resistor (1/8W33kΩ)	2
$R_{12,16}$	117-1021-10	Chip resistor (1/8W1kΩ) S	2
R_5	117-2211-10	Chip resistor (1/8W220Ω) S	1
R_7	117-4701-10	Chip resistor (1/8W47Ω) S	1
R_3	117-6831-10	Chip resistor (1/8W68kΩ) S	1
C_8	171-1033-06	Ceramic capacitor (0.01μF) SC	1
C_{22}	174-1000-13	Ceramic capacitor (10pF) TC	1
C_4	174-5090-13	Ceramic capacitor (5pF) TC	1
C_2	174-5600-13	Ceramic capacitor (56pF) TC	1
C_{14}	174-6090-13	Ceramic capacitor (6pF) TC	1
C_1	174-8090-13	Ceramic capacitor (8pF) TC	1
$C_{11,21}$	175-1007-00	Ceramic chip capacitor (10pF) TC	2
$C_{3,5,17}$	175-1501-00	Ceramic chip capacitor (15pF) TC	3
$C_{16,18}$	175-1801-00	Ceramic chip capacitor (18pF) TC	2
C_9	175-6097-00	Ceramic chip capacitor (6pF) TC	1
C_{19}	175-8097-00	Ceramic chip capacitor (8pF) TC	1
C_7	177-1032-05	Ceramic chip capacitor (0.01μF) HD	1
$C_{12,15,20}$	177-4732-05	Ceramic chip capacitor (0.047μF) HD	3
$C_{6,10}$	178-1032-05	Ceramic chip capacitor (0.01μF) HD,S	2
C_{23}	178-2232-05	Ceramic chip capacitor (0.022μF) HD,S	1
$C_{13,24}$	183-1053-62	Electrolytic capacitor (50V1μF) USS	2

Note : OM (Oxidized Metal) SS (Super Small)
S (Small) TC (Temperature-Compensating)
HD (Higher Dielectric) LL (Low Leak)
SC (Semi-Conductor) USS (Ultra Super Small)

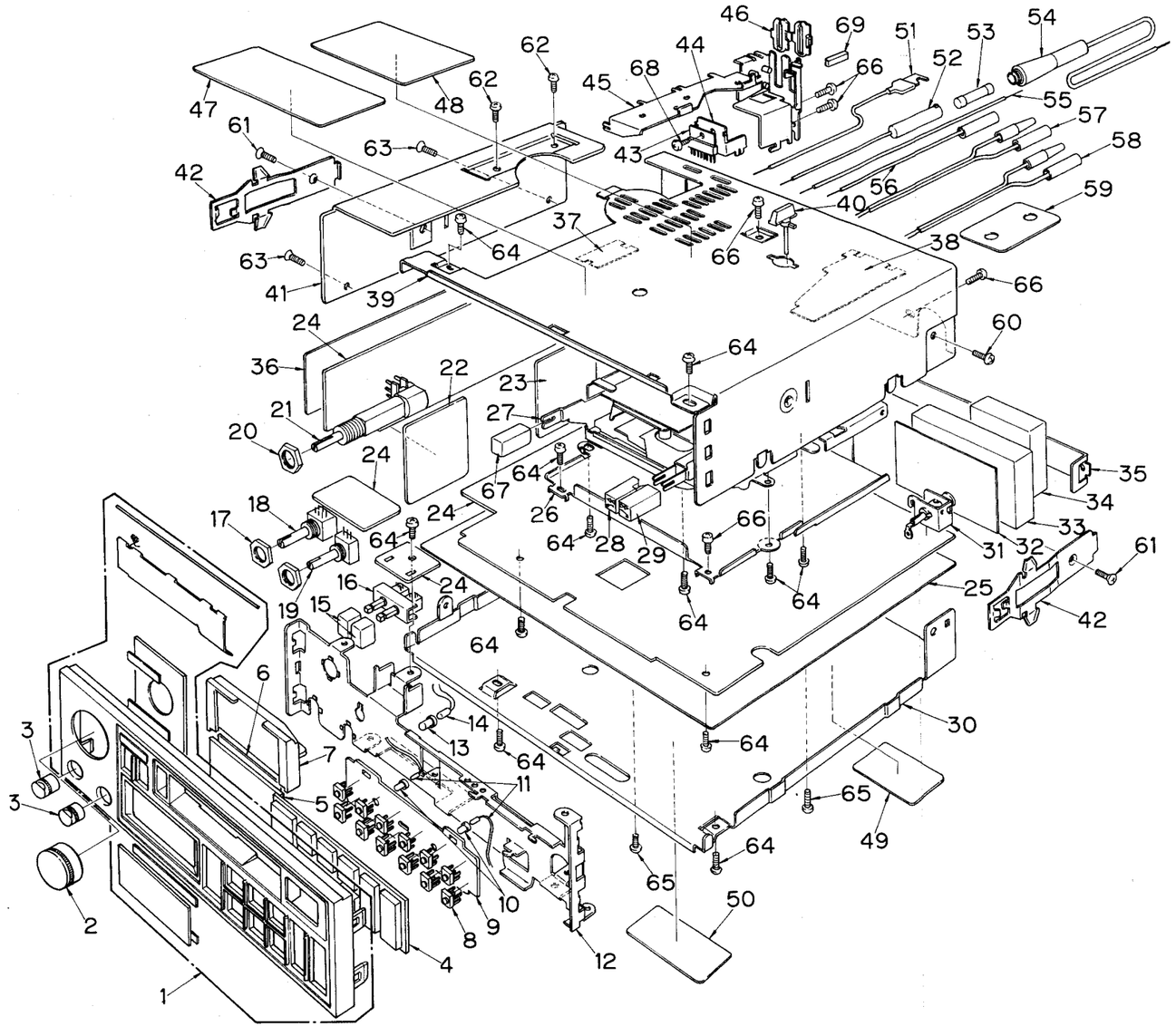
■941-0146-00 MW/LW TUNER PACK:

■CIRCUIT DIAGRAM:



■EXPLODED VIEW • PARTS LIST:

◎Main section



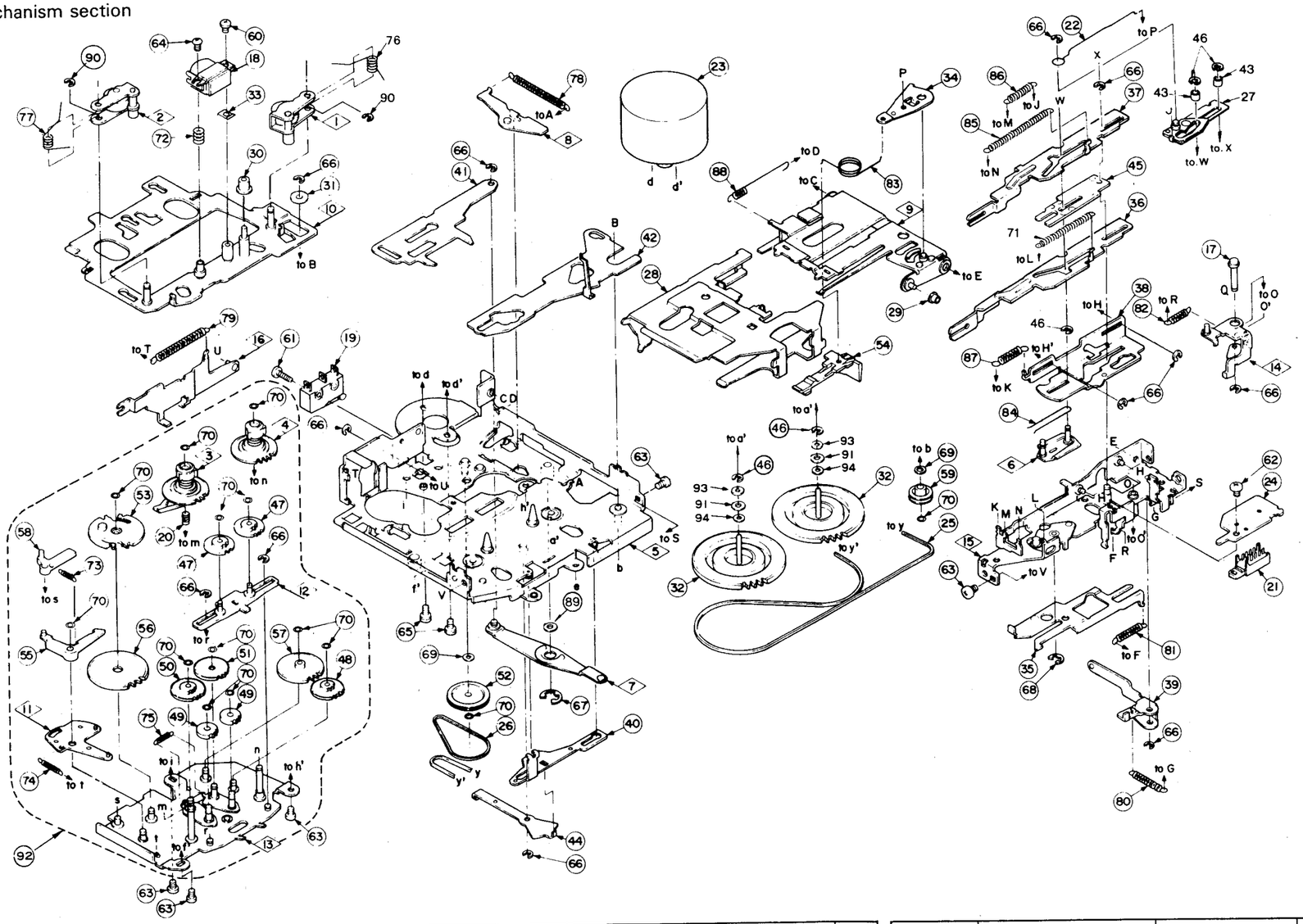
REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
1	940-2884-00 (PE-9065A) 940-2884-01 (PE-9066A)	Escutcheon ass'y	1
2	380-4668-00	Knob (VOL)	1
3	380-4669-00	Knob (BAL/TONE)	2
4	382-0843-00 (PE-9065A) 382-0843-01 (PE-9066A)	Button	1
5	379-0100-00	Indicator	1
6	335-2012-00	Color filter	1
7	335-2013-00	LCD holder	1
8	013-3694-00	Switch	12
9	099-7452-00	P.W.B	1
10	345-3436-10	P.L cap	2

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
11	017-0338-14	Pilot lamp	2
12	309-0540-00	Front plate	1
13	345-3621-01	P.L cap	1
14	017-0339-00	Pilot lamp	1
15	382-0846-00	Button (NL/LD)	2
16	013-3782-00	Switch (NL/LD)	1
17	722-0282-00	Nut	2
18	012-4365-00	Variable resistor (TONE)	1
19	012-4364-00	Variable resistor (BAL)	1
20	722-0231-00	Nut	1

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
21	012-4368-00	Variable resistor (VOL)	1
22	099-7439-00	P.W.B (SDK) (PE-9065A)	1
23	099-7438-00	P.W.B (NC-MPX)	1
24	099-7451-00	P.W.B	1
25	347-1839-00	Insulator	1
26	330-8217-00	Mechanism bracket	1
27	930-0521-00	Mechanism	1
28	382-0692-00	Button (◁◁)	1
29	382-0693-00	Button (▷▷)	1
30	311-1190-00	Lower case	1
31	092-0579-00	Antenna receptacle	1
32	347-1876-00	Insulator	1
33	941-0146-00	Tuner pack (LW, MW)	1
34	970-0304-00	Tuner pack (FM)	1
35	330-8219-00	Earth plate	1
36	347-1840-00	Insulator	1
37	347-1029-00	Insulator	1
38	347-1867-00	Insulator	1
39	310-1226-00	Upper case	1
40	335-1360-00	Lock pin	1
41	313-1234-00	Heat sink	1
42	750-2486-00	Spring	2
43	051-0526-00	IC (MB3756)	1
44	330-8218-00	IC bracket	1
45	944-0706-01	Filter ass'y	1
46	335-1164-00	Lead holder	2
47	285-0915-00	Guide label	1
48	285-1000-00	Guide label	1
49	286-5609-00 (PE-9065A) 286-5610-00 (PE-9066A)	Set plate	1
50	347-1787-01	Label	1
51	840-0386-00	Bonding wire	1
52	850-1822-00	A-lead	1
53	120-0050-00	Fuse (5A)	1
54	850-2258-00	A-lead	1
55	850-2110-02	A-lead	1
56	852-6652-01	Extension lead	1
57	851-2547-00	SP lead	1
58	851-2547-01	SP lead	1
59	285-0838-01	Guide label	1
60	714-3006-81	Machine screw (M3x6)	1
61	714-3006-49	Machine screw (M3x6)	2
62	714-2608-81	Machine screw (M2.6x8)	2
63	731-3006-40	Tap tight (M3x6)	2
64	714-3004-81	Machine screw (M3x4)	13
65	731-3008-80	Tap tight (M3x8)	2
66	731-3006-80	Tap tight (M3x6)	4
67	382-0691-00	Button (◁ ▷)	1
68	714-3003-81	Machine screw (M3x3)	1
69	345-4122-00	Spacer	1

■EXPLODED VIEW • PARTS LIST:

◎Tape mechanism section



REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
1	960-3321-06	Roller F ass'y	1
2	960-3322-06	Roller R ass'y	1
3	960-3323-01	Reel base ass'y	1
4	960-3324-01	Reel base ass'y	1
5	960-3569-03	Deck plate ass'y	1
6	960-3568-02	Spring H ass'y	1
7	960-3328-04	Coupling P ass'y	1
8	960-3329-01	Link ass'y	1
9	960-3330-07	Guide arm ass'y	1
10	960-3562-06	Head plate ass'y	1
11	960-3332-03	Check P-B ass'y	1
12	960-3333-02	FF plate ass'y	1
13	960-3334-06	Bottom P ass'y	1
14	960-3577-03	Lock plate ass'y	1

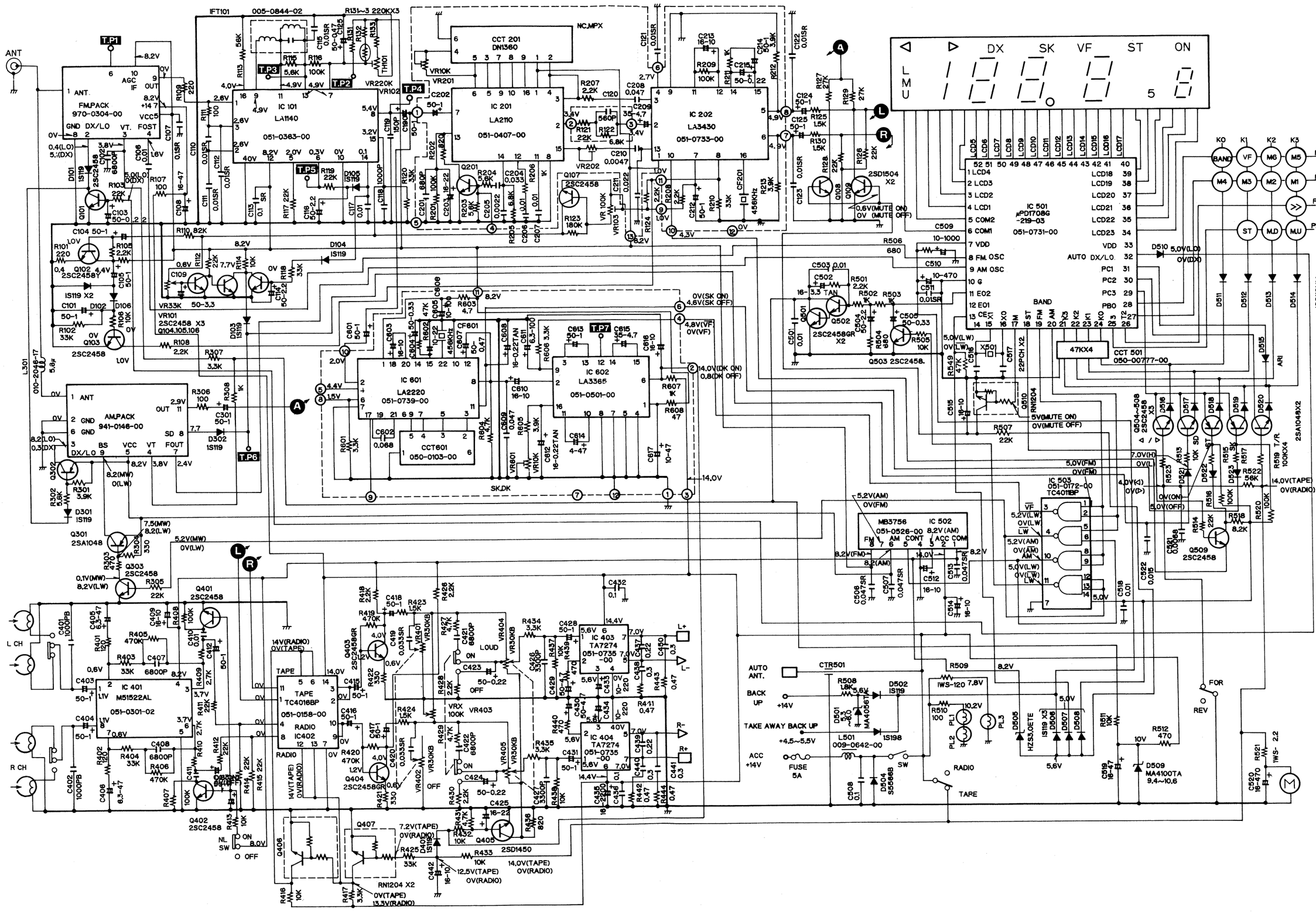
REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
15	960-3567-04	Frame ass'y	1
16	960-3564-00	Program lever ass'y	1
17	632-1153-01	Lock plate pin	1
18	011-0287-02	Head	1
19	013-2690-03	Switch	1
20	750-2155-00	Spring	1
21	013-3646-00	Switch	1
22	750-2360-01	Spring	1
23	960-3578-00	D.C. motor ass'y	1
24	099-6942-01	P.W.B	1
25	602-0086-00	Belt-A	1
26	602-0069-00	Belt-B	1
27	960-3565-01	Over plate ass'y	1
28	606-0071-06	Pack guide	1

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
29	610-0080-00	Roller	1
30	610-0258-01	Head P-roller	1
31	610-0104-02	Roller	1
32	611-0069-02	Flywheel	2
33	630-1279-00	Spacer	1
34	630-1394-03	Swing plate	1
35	630-1399-04	Off plate-B	1
36	630-1669-03	FF lever-A	1
37	630-1670-02	REW lever	1
38	960-3563-02	Eject plate ass'y	1
39	630-1405-01	Off arm	1
40	630-1407-03	FF plate-B	1
41	630-1410-00	Power plate	1
42	630-1691-01	Change plate	1

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
43	632-1557-00	Roller	2
44	630-1420-00	FF link	1
45	630-1671-01	Hold plate	1
46	744-0024-01	E-ring	5
47	631-0353-00	FF-REW gear	2
48	631-0354-01	Gear-B	1
49	631-0355-01	Play idler gear	2
50	631-0356-00	Gear-R	1
51	631-0357-00	Gear-F	1
52	631-0358-02	Gear pulley	1
53	960-3506-01	Power gear ass'y	1
54	631-0455-01	Pack stopper	1
55	631-0361-00	Lock link	1
56	631-0362-01	Cam gear	1
57	631-0363-02	Gear-A	1
58	631-0364-02	Sub lock link	1
59	604-0028-00	Tension pulley	1
60	714-2003-81	Machine screw (M2x3)	1
61	714-2308-81	Machine screw (M2.3x8)	1
62	716-0485-00	Screw	1
63	714-2604-81	Machine screw (M2.6x4)	5
64	716-0429-00	Screw (for Head azimuth)	1
65	716-0347-00	Screw	2
66	743-1500-10	E-ring	12
67	743-4000-10	E-ring	1
68	744-0006-01	E-ring	1
69	745-0645-00	Washer	2
70	746-0628-01	Washer	14
71	750-2357-02	Spring	1
72	750-1910-00	Spring	1
73	750-2134-00	Spring	1
74	750-2135-01	Spring	1
75	750-2136-02	Spring	1
76	750-2372-01	Spring	1
77	750-2378-01	Spring	1
78	750-2139-01	Spring	1
79	750-2140-02	Spring	1
80	750-2141-01	Spring	1
81	750-2142-02	Spring	1
82	750-2374-00	Spring	1
83	750-2361-01	Spring	1
84	750-2199-00	Spring	1
85	750-2356-02	Spring	2
86	750-2359-00	Spring	1
87	750-2358-00	Spring	1
88	750-2150-00	Spring	1
89	745-0640-00	Washer	1
90	743-2000-10	E-ring	2
91	746-0730-00	Washer	2
92	960-3580-01	Bottom sub ass'y	1
93	746-0732-00	Washer	2
94	746-0617-00	Washer	2

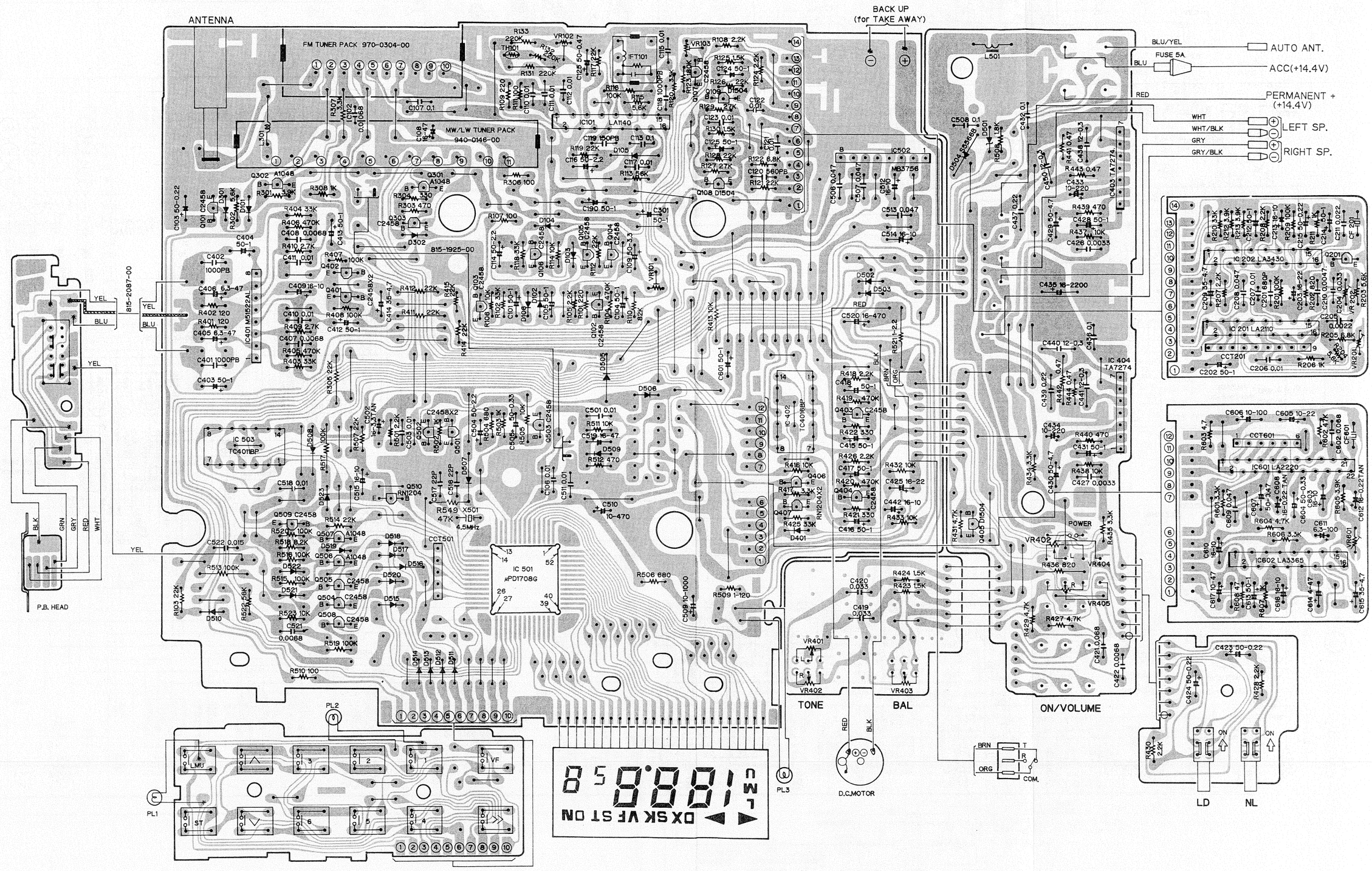
■CIRCUIT DIAGRAM:

◎E921



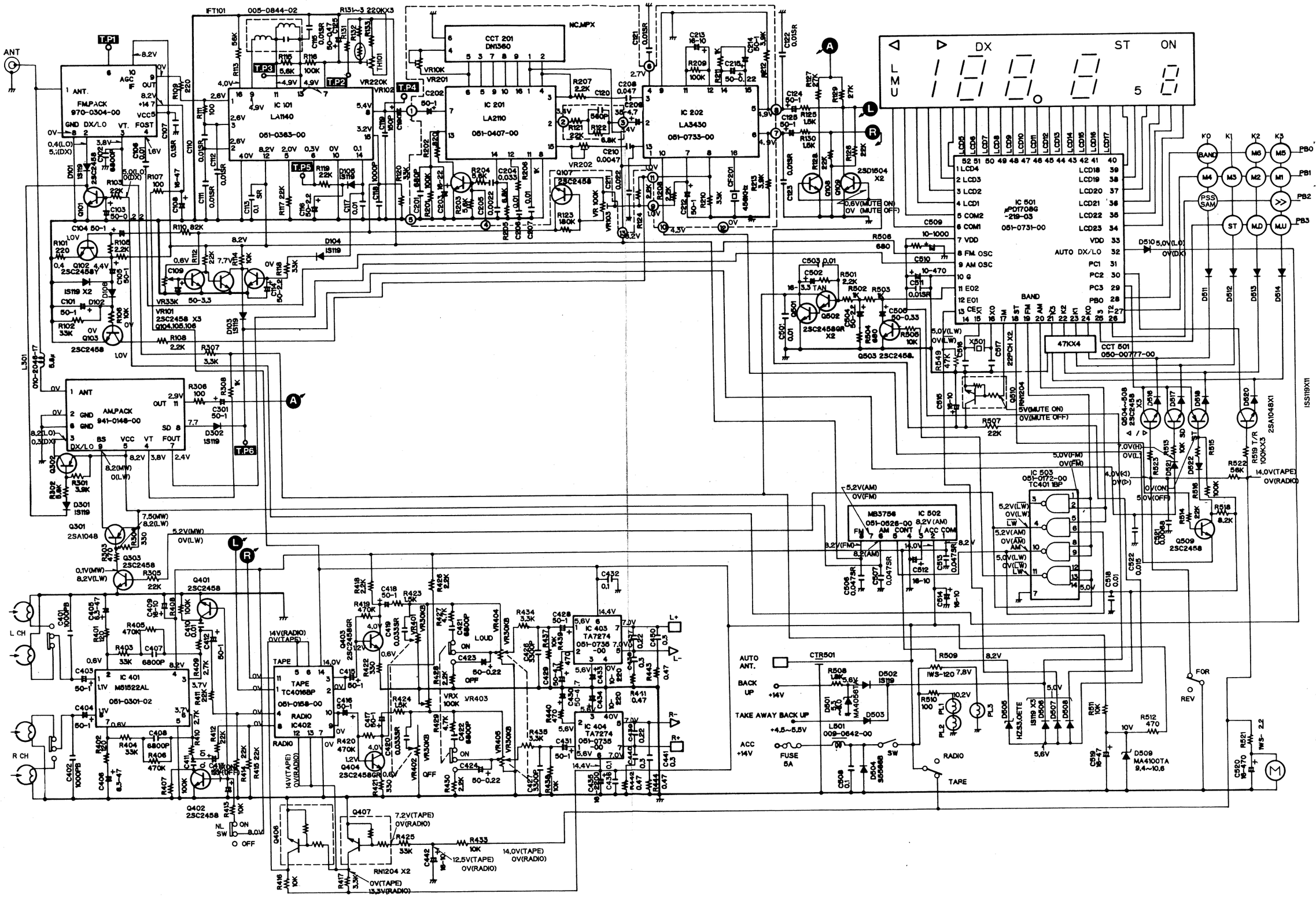
■PRINTED WIRING BOARD:

◎E921



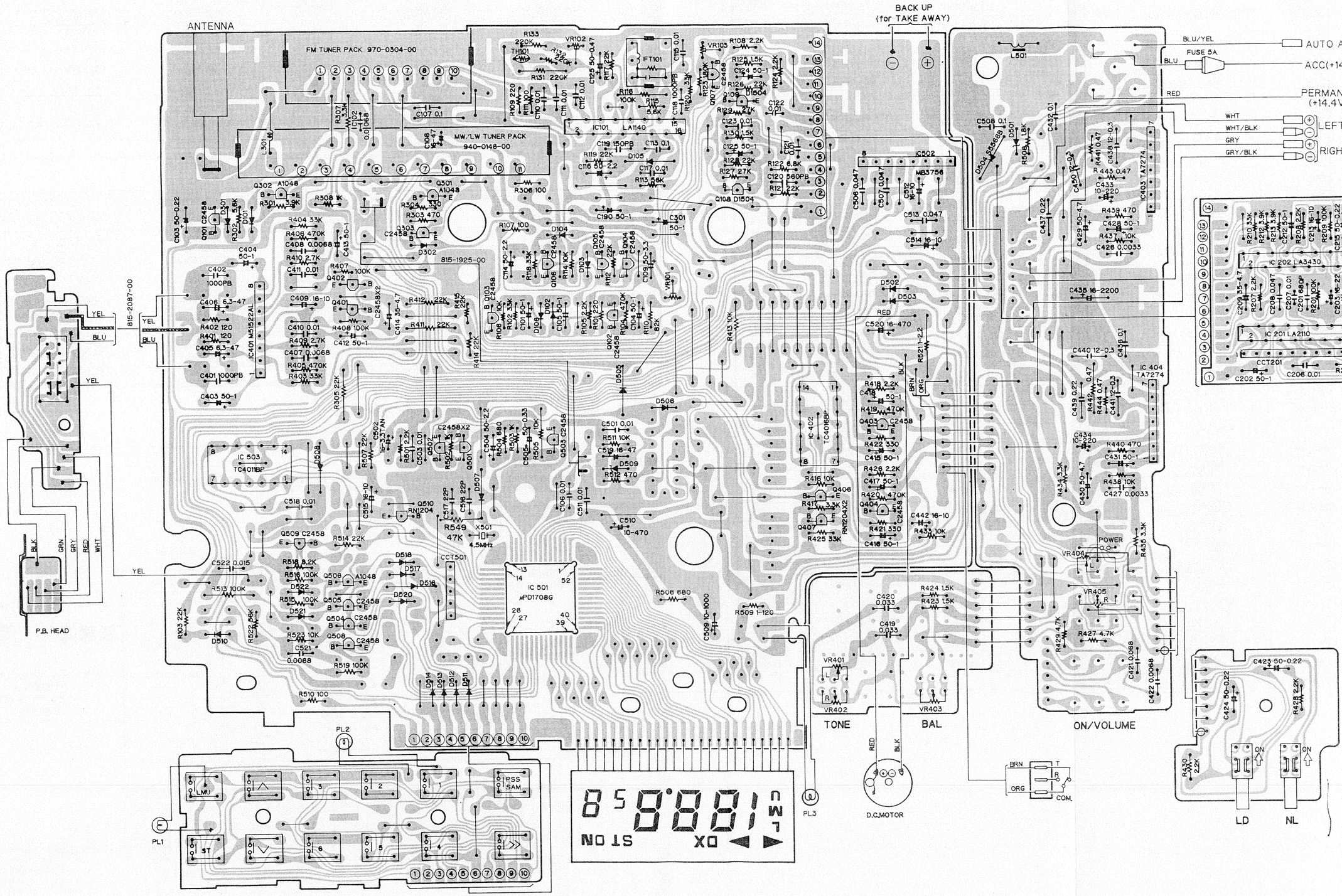
■CIRCUIT DIAGRAM:

◎E920



■PRINTED WIRING BOARD:

◎E920



■PARTS LIST:

◎Electrical section

◎MAIN P.W.B

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
$D^{101\sim106,301,302,401,502,506\sim508,510\sim523}$	001-0330-00	Diode (1SS119)	27
D_{504}	001-0360-00	Diode (S5566B)	1
D_{503}	001-0361-00	Diode (1SS198)	1
D_{501}	001-0423-19	Diode (MA4056)	1
D_{509}	001-0423-25	Diode (MA4100)	1
D_{505}	001-0425-12	Diode (HZS3.0E)	1
TH_{101}	002-0184-00	Thermistor (30kΩ)	1
IFT_{101}	005-0844-02	IF-transformer	1
L_{501}	009-0642-00	Choke	1
L_{301}	010-2046-17	Coil (5.6μH)	1
VR_{101}	012-3808-08	Variable resistor (33kΩ)	1
VR_{103}	012-3808-10	Variable resistor (100kΩ)	1
VR_{102}	012-3808-11	Variable resistor (220kΩ)	1
CCT_{501}	050-0077-00	Component circuit	1
IC_{402}	051-0158-00	IC (TC4016BP)	1
IC_{503}	051-0172-00	IC (TC4011BP)	1
IC_{401}	051-0301-02	IC (M51522AL)	1
IC_{101}	051-0363-00	IC (LA1140)	1
IC_{502}	051-0526-00	IC (MB3756)	1
IC_{501}	051-0731-00	IC (μPD1708G-219-03)	1
$IC_{403,404}$	051-0735-00	IC (TA7274P)	2
X_{501}	061-1037-00	Crystal	1
$Q_{507}^{301,302,503,506}$	100-1048-50	Transistor (2SA1048YGR)	5
$Q_{102,107}$	102-2458-25	Transistor (2SC2458Y)	2
$Q_{403,404,501,502}$	102-2458-28	Transistor (2SC2458GR)	4
$Q^{101,103,104,105,106,303,401,402,504,505,508,509}$	102-2458-50	Transistor (2SC2458YGR)	12
$Q_{108,109}$	103-1504-00	Transistor (2SD1504)	2
$Q_{406,407,510}$	125-2004-04	Transistor (RN1204)	3
R_{119}	032-0059-05	Film resistor (¼Ws22kΩ)	1
R_{115}	032-0059-49	Film resistor (¼Ws5.6kΩ)	1
R_{131}	032-0059-60	Film resistor (¼Ws220kΩ)	1
R_{509}	114-1211-11	Film resistor (1Ws120Ω) OM	1
R_{521}	114-2291-11	Film resistor (1Ws2.2Ω) OM	1
$C_{438,440,441,450}$	043-0122-00	Ceramic capacitor (12V0.3μF)	4
$C_{118,401,402}$	160-1022-05	Ceramic capacitor (1000pF B) HD	3

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
C_{119}	160-1512-05	Ceramic capacitor (150pF B) HD	1
C_{120}	160-5612-05	Ceramic capacitor (560pF B) HD	1
$C^{106,107,110,111,112,115,117,121,122,123,410,411,501,503,511,518}$	171-1033-06	Ceramic capacitor (0.01μF SR) SC	16
C_{113}	171-1043-06	Ceramic capacitor (0.1μF SR) SC	1
C_{522}	171-1533-06	Ceramic capacitor (0.015μF SR) SC	1
$C_{426,427}$	171-3323-06	Ceramic capacitor (3300pF SR) SC	2
$C_{419,420}$	171-3333-06	Ceramic capacitor (0.033μF SR) SC	2
$C_{506,507,513}$	171-4733-06	Ceramic capacitor (0.047μF SR) SC	3
$C^{102,407,408,421,422,521}$	171-6823-06	Ceramic capacitor (6800pF SR) SC	6
$C_{516,517}$	174-2200-13	Ceramic capacitor (22pF CH) TC	2
$C_{432,436,508}$	173-1042-10	Polyester capacitor (0.1μF) S	3
$C_{437,439}$	173-2242-10	Polyester capacitor (0.22μF) S	2
C_{502}	042-0201-00	Tantalum capacitor (16V3.3μF)	1
$C^{124,125,415,416,417,418,428,431}$	179-1053-62	Electrolytic capacitor (50V1μF) S	8
$C_{512,514}$	179-1063-32	Electrolytic capacitor (16V10μF) S	2
C_{509}	179-1083-23	Electrolytic capacitor (10V1000μF) S	1
C_{425}	179-2263-32	Electrolytic capacitor (16V22μF) S	1
$C_{433,434}$	179-2273-23	Electrolytic capacitor (10V220μF) S	2
C_{435}	179-2283-31	Electrolytic capacitor (16V2200μF) S	1
C_{125}	179-4743-62	Electrolytic capacitor (50V0.47μF) S	1
$C_{429,430}$	179-4753-62	Electrolytic capacitor (50V4.7μF) S	2
C_{510}	179-4773-23	Electrolytic capacitor (10V470μF) S	1
C_{520}	179-4773-33	Electrolytic capacitor (16V470μF) S	1
C_{442}	182-1063-33	Electrolytic capacitor (16V10μF) SS	1
$C_{423,424}$	182-2243-62	Electrolytic capacitor (50V0.22μF) SS	2
$C^{101,104,105,301,403,404,412,413,601}$	183-1053-62	Electrolytic capacitor (50V1μF) USS	9
$C_{409,515}$	183-1063-32	Electrolytic capacitor (16V10μF) USS	2
C_{103}	183-2243-62	Electrolytic capacitor (50V0.22μF) USS	1
$C_{114,116,504}$	183-2253-62	Electrolytic capacitor (50V2.2μF) USS	3
C_{505}	183-3343-62	Electrolytic capacitor (50V0.33μF) USS	1
C_{109}	183-3353-62	Electrolytic capacitor (50V3.3μF) USS	1
C_{414}	183-4753-52	Electrolytic capacitor (35V4.7μF) USS	1
$C_{405,406}$	183-4763-12	Electrolytic capacitor (6.3V47μF) USS	2
$C_{108,519}$	183-4763-32	Electrolytic capacitor (16V47μF) USS	2

◎NC-MPX P.W.B

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
VR_{201}	012-3707-05	Variable resistor (VR10kΩ)	1
VR_{202}	012-3707-08	Variable resistor (VR100kΩ)	1
CCT_{201}	050-0099-00	Component circuit (DN1360E)	1
IC_{201}	051-0407-00	IC (LA2110)	1
IC_{202}	051-0733-00	IC (LA3430)	1
CF_{201}	060-0115-01	Ceramic resonator (CBS456F11)	1
Q_{201}	102-2458-25	Transistor (2SC2458Y)	1
C_{201}	160-6812-05	Ceramic capacitor (680pF B) HD	1
$C_{206,207}$	171-1033-06	Ceramic capacitor (0.01μF) SC	2
C_{205}	171-2223-06	Ceramic capacitor (2200pF) SC	1

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
C_{211}	171-2233-06	Ceramic capacitor (0.022μF) SC	1
C_{204}	171-3333-06	Ceramic capacitor (0.033μF) SC	1
C_{210}	171-4723-06	Ceramic capacitor (4700pF) SC	1
C_{208}	171-4733-06	Ceramic capacitor (0.047μF) SC	1
$C_{202,212,214}$	182-1053-62	Electrolytic capacitor (50V1μF) SS	3
C_{213}	182-1063-32	Electrolytic capacitor (16V10μF) SS	1
C_{215}	182-2243-62	Electrolytic capacitor (50V0.22μF) SS	1
C_{203}	182-2263-32	Electrolytic capacitor (16V22μF) SS	1
C_{209}	182-4753-52	Electrolytic capacitor (35V4.7μF) SS	1

◎SDK P.W.B

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
VR_{601}	012-3707-05	Variable resistor (VR-10kΩ)	1
CCT_{601}	050-0103-00	Component circuit (TCB06T000)	1
IC_{602}	051-0501-00	IC (LA3365)	1
IC_{601}	051-0739-00	IC (LA2220)	1
CF_{601}	060-0115-01	Ceramic resonator (CSB456F11)	1
C_{609}	171-4733-06	Ceramic capacitor (0.047μF) SC	1
C_{602}	173-6831-10	Polyester capacitor (0.068μF J) S	1
$C_{608,612}$	042-0249-00	Tantalum capacitor (16V0.22μF)	2
C_{613}	182-1053-62	Electrolytic capacitor (50V1μF) SS	1

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
$C_{603,610,616}$	182-1063-32	Electrolytic capacitor (16V10μF) SS	3
C_{611}	182-1073-12	Electrolytic capacitor (6.3V100μF) SS	1
C_{606}	182-1073-22	Electrolytic capacitor (10V100μF) SS	1
C_{605}	182-2263-22	Electrolytic capacitor (10V22μF) SS	1
C_{604}	182-3343-62	Electrolytic capacitor (50V0.33μF) SS	1
C_{607}	182-4743-62	Electrolytic capacitor (50V0.47μF) SS	1
C_{615}	182-4753-52	Electrolytic capacitor (35V4.7μF) SS	1
C_{614}	182-4763-02	Electrolytic capacitor (4V47μF) SS	1
C_{617}	182-4763-22	Electrolytic capacitor (10V47μF) SS	1

Note : OM (Oxidized Metal) SS (Super Small)
S (Small) TC (Temperature-Compensating)
HD (Higher Dielectric) LL (Low Leak)
SC (Semi-Conductor) USS (Ultra Super Small)

● How to read resistor

Resistors are deleted from the table of electric components, (except metal film resistors and special resistors). They can be converted to product Nos. as follows.

Film resistor (Carbon film resistor)

□□□-□□□□-□□

Classification	Resistance*	Tolerance of the value of resistance		Rated power			Shape	
		0		0			0	
	Example	1	± 5%	1	⅛W	Approx. 3.7mm	1	Horizontal
	33Ω = 330	2		2	¼Ws	Approx. 6.5mm	2	Vertical
1 1 1	33kΩ - 333	3		3			3	
		4		4	½W	Approx. 9mm	4	
				7	⅛W	Approx. 3.5mm		
				8	½Ws	Approx. 6.6mm		
				9	¼Wss	Approx. 3.2mm		

(Example)

Film resistor ¼Ws 1kΩ ± 5% Vertical

1 1 1 - 1 0 2 1 - 2 2

□□□-■■■□-□□

T

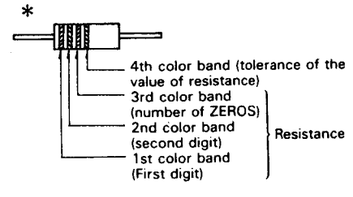
Note 1. The first two of three digits representing resistance are effective digits and the last one represents number of "0" following this.
Unit is given in ohm (Ω).

Example of conversion of resistance T ■■■□

Note: R : Resistance, T : Converted value

R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T
Ω 0.1	108	Ω 1.0	109	Ω 10	100	Ω 100	101	kΩ 1.0	102	kΩ 10	103	kΩ 100	104	MΩ 1.0	105	MΩ 10	106	MΩ 100	107
0.15	158	1.5	159	15	150	150	151	1.5	152	15	153	150	154	1.5	155	15	156	150	157

COLOR	BLK	BRN	RED	ORG	YEL	GRN	BLU	PUR	GRY	WHT	GOLD	SILVER	NO COLOR
1st color band	0	1	2	3	4	5	6	7	8	9			
2nd color band	0	1	2	3	4	5	6	7	8	9			
3rd color band	10^0	10^1	10^2	10^3	10^4	10^5	10^6				10^{-1}	10^{-2}	
4th color band											± 5% (J)	± 10% (K)	± 20% (M)


*
4th color band (tolerance of the value of resistance)
3rd color band (number of ZEROS)
2nd color band (second digit)
1st color band (First digit)
Resistance

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